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TIMBER MANAGEMENT PLAN

BITTERROOT WORKING CIRCLE

BITTERROOT NATIONAL FOREST

MONTANA



10-634 December 6, 1961

ADDENDA

This plan does not consider the impact of the Sleeping Child fire, which occurred in August 1961, on the inventory or related annual allowable cut calculations.

All field work and compilation of data were completed prior to the date of the fire. To recompile these data after the full impact of the fire is known would delay submission of the plan a year or more. Therefore, it was decided to submit the plan as is, and prepare an amendment to the plan, if necessary, when needed information for this purpose is known.

Some general data concerning the Sleeping Child fire are as follows:

1. Total area burned: 26,581 acres.

2. Total land burned by ownerships:

National forest	25,236	acres
State	625	"
Forest industries	<u>720</u>	"
Total	26,581	acres

3. Total national-forest land area burned by major land classes:

Total	Forest Land					
	Non- forest	Non- com'l	Total	Total	Commercial Stocked	Commercial Nonstocked
Acres						
25,236	108	25,128	20	25,108	25,088	20

4. Volume of sawtimber within burned area by species:

Species	MMBF	Percent
P	4.3	3
L-D	32.0	28
S	40.5	35
Firs	22.1	19
LP	<u>17.4</u>	<u>15</u>
Total	116.3	100

5. Volume of poletimber within burned area by species:

<u>Species</u>	<u>MMCF</u>
L-D	1.4
S	0.7
Firs	4.5
LP	<u>9.5</u>
Total	16.1

6. Probable reduction in annual allowable cut: 1.0 MM board feet.

7. Approximate volume of fire salvage timber sold as of December 1, 1961:  
50.0 MM board feet.

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TIMBER MANAGEMENT PLAN  
BITTERROOT WORKING CIRCLE  
BITTERROOT NATIONAL FOREST  
REGION ONE, MONTANA  
1961

A. TITLE AND APPROVAL SHEET

Submitted by: /s/ Bernie A. Swift 2/12/62  
Forester (Timber Mgt.)

Approved by: /s/ Harold E. Andersen 2/12/62  
Forest Supervisor

/s/ W. H. Johnson 3/20/62  
Acting Regional Forester

/s/ DJM /s/ Clare Hendee 4/16/62  
Acting Chief

Reviewed by:  
Regional Office

Timber Management /s/ G. F. Weyermann 3/19/62

Recreation, Lands &  
Watershed Management /s/ E. F. Barry 3/19/62

Range & Wildlife Mgt. /s/ W. W. Dresskell 3/19/62

Engineering /s/ John A. Adams 3/20/62

Fire Control /s/ E. R. DeSilvia 3/19/62

State and Private /s/ E. H. Juntunen 3/19/62

Research

Forest Disease /s/ James W. Kimmey 2/ 2/62

Forest Insect /s/ D. E. Parker 2/ 1/62

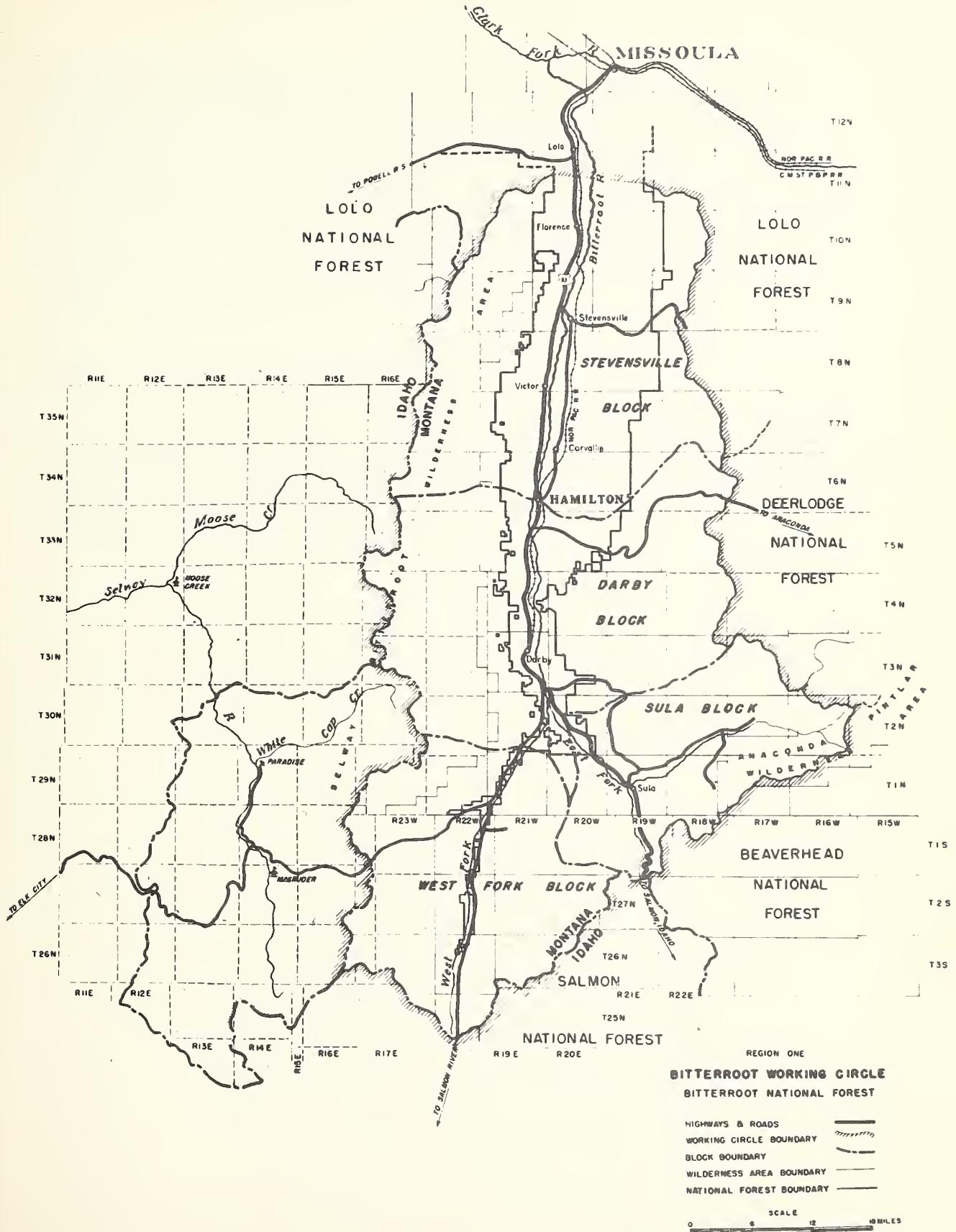
Forest Management /s/ C. A. Wellner 2/ 2/62

Washington Office

Timber Management \_\_\_\_\_

Multiple Use Coordination \_\_\_\_\_







## FOREWORD

Instructions from Congress provide, among other objectives, that the national forests shall be managed to furnish a continuous supply of timber for the use of citizens of the United States. Forest Service policy requires the development and application of sustained yield management of the national forests, working circle by working circle, as provided for in the Multiple Use-Sustained Yield Act of June 12, 1960. It is the purpose of this plan to apply the timber management policies and objectives of national forest administration growing out of related Federal laws, and as currently set forth in the Forest Service Manual, to the management of the timber resources of the national-forest lands within the Bitterroot Working Circle of the Bitterroot National Forest.

Basic data on area and volumes for the plan were collected and compiled during the years 1958 to 1960, inclusive.

Field sampling was done in cooperation with the Intermountain Range and Forest Experiment Station. Compilation was done by Terry D. Hobson, Robert Boyer, and Timothy Burns, Foresters. The plan was prepared and written by Bernie A. Swift under the general supervision of Forest Supervisor Harold E. Andersen. Technical assistance was provided by the Division of Timber Management, Missoula, Montana.



C. SUMMARY OF PLAN

LAND AND TIMBER OWNERSHIP

Ownership	Areas by Land Class				Sawtimber Volumes by Species					Other Prod. MMCF
	Total	Non-com'l	Com'l	Non-forest	P	D-L	S-AF	LP-WLP	Total	
<u>MONTANA</u>			Acres				MMBF	(Scribner)		
<u>Nat'l For.</u>										
Nonres.	774676	34416	709313	30947	815.7	1570.6	811.8	261.6	3459.7	299.1
Res.	799950	301273	408993	89684	-	-	-	-	-	-
<u>State</u>	17809	50	16396	1363	43.4	42.3	5.0	3.6	94.3	3.8
<u>Other Pub.</u>	120	-	120	-	-	.3	-	.1	.4	-
<u>For. Ind.</u>	18479	305	18051	123	15.7	62.6	16.4	7.7	102.4	8.0
<u>Other Priv.</u>	39219	125	28321	10773	47.4	60.3	9.6	6.2	123.5	8.2
<b>TOTAL</b>	<b>1650253</b>	<b>336169</b>	<b>1181194</b>	<b>132890</b>	<b>922.2</b>	<b>1735.1</b>	<b>842.8</b>	<b>279.2</b>	<b>3780.3</b>	<b>319.1</b>

GROWTH AND MORTALITY

Growth Expression	Sawtimber			Other Products	
	/acre/year	Total	/acre/year	Total	
<u>Periodic Annual Increment</u>	79	47.6	9.1	5.5	
<u>Mortality</u>	9	5.6	1.1	0.6	
<u>Mean Annual Increment</u>	37	27.3	2.6	4.8	

ANNUAL ALLOWABLE CUT FROM NATIONAL FOREST LANDS

Kind of Cutting	Area by Types					Volumes by Types					Other Prod. MMCF
	P	D-L	S-AF	LP-WLP	Total	P	D-L	S-AF	LP-WLP	Total	
			Acres				MMBF	(Scribner)			
<u>Harvest (Sawt.)</u>	2,200	1,500	700	300	4,700	15.0	19.0	8.0	2.0	44.0	2.2
<u>Harvest (Pole)</u>	-	-	-	2,000	2,000	-	-	-	-	-	2.3
<u>Intermediate</u>	800	400	100	1,000	2,300	.3	1.0	.1	.5	2.0	0.5

Control will be primarily by area with coordinating volume control.

REVISION DATE: 1971



#### D. MANAGEMENT PLAN

##### 1. LAND DESCRIPTION

###### a. Location

The nonreserved portion of the Bitterroot Working Circle is located within Ravalli County and a small part of Missoula County, Montana, and lies within the proclaimed boundaries of the Bitterroot National Forest. Both forest and working circle receive their names from the Bitterroot River which drains the area. Missoula, Montana, is sixteen miles north of the working circle.

###### b. Boundaries

The working circle is bounded on the north by the Lolo National Forest, on the east by the Sapphire Mountains, on the south by the Idaho-Montana line, and on the west by the Bitterroot Mountains. It is, in fact, identical with the forest boundary except on the southwest where the Idaho-Montana divide excludes the Magruder Ranger District.

###### c. Subdivisions

The working circle is divided into four blocks that coincide with the four ranger districts, and into 169 compartments (appendix map A). The ranger districts are Stevensville, Darby, Sula, and West Fork, forming the Montana portion of the Bitterroot National Forest. All are supervised from Hamilton, Montana, near the center of the working circle. The number of compartments, areas, and percentage of area in each block are as follows:

Block and District	Number of Compartments	Gross Area National Forest - - - Acres - - -	Percentage of Area In Each District
Stevensville	39	107,253	13.8
Darby	53	194,434	25.1
Sula	31	177,029	22.9
West Fork	46	295,960	38.2
<b>TOTAL</b>	<b>169</b>	<b>774,676</b>	<b>100.0</b>

###### d. Relation to Other Working Circles

This working circle is the only one on the Bitterroot Forest. The Magruder District is not considered a separate working circle, since all of it is in the Selway-Bitterroot Primitive Area at the present time.

The Missoula Working Circle borders the Bitterroot Working Circle on the north, west, and east. The Deerlodge and Big Hole Working Circles also border on the east side. Some of the timber in these neighboring working circles could be transported into or through the Bitterroot Working Circle more economically than it could be manufactured elsewhere. This is particularly true of timber from the Big Hole Working Circle and from the Salmon National Forest of Region 4, which border on the southeast and south. Some of the timber from these neighboring forests is already being milled within the working circle at Darby, Montana. Although most of the timber cut in this working circle is sawed into lumber locally, much of it is dried and finished at Missoula and shipped from there.

U.S. Highway 93 and the Northern Pacific Railway bisect the area north and south, and are the main arteries for moving products of the forest. Competition has developed for timber products from the working circle in and around Missoula.

e. Wilderness and Primitive Areas

This plan considers management of the timber only in the nonreserved acreage of the forest. The primitive area on the west side of the Bitterroot River (in Montana) and the Magruder Ranger District (in Idaho) are reserved areas within the exterior boundaries of the working circle. These areas are of the following sizes:

Selway-Bitterroot	756,682 acres
Anaconda-Pintlar	<u>43,268</u> acres
Total	799,950 acres

Study of the Selway-Bitterroot Primitive Area for purposes of reclassifying it under Regulation U-1 was completed in 1959 and 1960. Public hearings on proposed changes were held in March 1961 and final recommendations for the area have been submitted to the Chief's office.

The proposed change of deleting 310,412 acres from primitive (wilderness) status in the Upper Selway drainage of the Magruder Ranger District and 54,331 acres from the east slope of the Bitterroot Range would have quite an impact on resources. It is estimated that the Upper Selway contains 202,340 acres of commercial forest land, and the east slope of the Bitterroot Range 21,060 acres of commercial forest land. Timber volumes for both areas are estimated to be over two billion board feet. If the above changes are made in the Selway-Bitterroot Primitive Area, an amendment will be made in the timber management plan and the available timber volumes will be included in the allowable cut for the working circle. See proposal and report, designated "2320 - Near Natural Areas - Selway-Bitterroot Wilderness Area (Proposed)" dated September 16, 1960.

## 2. SUMMARY OF RESULTS UNDER PREVIOUS PLANS

### a. Previous Plan

Management plans for the working circle were completed and approved in 1941 and 1957.

The 1941 plan established a cut of 7.5 MM board feet for ponderosa pine but did not regulate the cut for other species. In 1946 the annual allowable cut of ponderosa pine was raised to 10 MM board feet in a plan revision. The 1957 plan changed the ponderosa pine allowable annual cut to 12 MM, mixed species to 14 MM, and considered a cut of 70 M cords of lodgepole pine annually.

The average annual cut in recent years (1946 to 1960 inclusive) has been 19.2 MM board feet, consisting of 9.3 MM of ponderosa pine, 9.1 MM of Douglas-fir, and 0.8 MM of other species. In the last five-year period, 1956 through 1960, the average annual cut has been 25.1 MM feet, consisting of 9.2 MM of ponderosa pine, 14.9 MM of Douglas-fir, and 1.0 MM of other mixed species. This is within 1.0 MM board feet of the annual allowable cut of sawtimber specified in the 1957 plan.

The 1957 plan recognized the need for harvesting overmature and decadent timber stands and securing a balanced distribution of age classes. Demand for lodgepole pine timber anticipated in this plan has not materialized. For actual cuts, 1946-1960, see appendix table 26.

### b. The Current Plan

The current timber management plan has been revised for the following reasons:

- (1) The 1957 plan was an interim plan and provided for revision in 1961.
- (2) Many areas previously considered noncommercial are now operable.
- (3) Smaller diameter limits and lower quality species are now being utilized.
- (4) More refined inventory and growth data have been secured through use of aerial photos and permanently established inventory plots.

## 3. FOREST DESCRIPTION

### a. Land Ownership and Land Classes

Table 1 shows the ownership and class of land within the working circle. Total nonreserved national forest ownership is 774,676 acres, of which 709,313 acres are classed as commercial forest land. National forest ownership is relatively solid except along the bottomlands of the

Bitterroot Valley and the east side of the Stevensville and Darby Blocks. Within the Montana portion of the working circle, national-forest land comprises 91.6 percent of the gross area; state, 2.0 percent; private, 6.4 percent; and other public (120 acres only), insignificant.

The principal large private holdings are Northern Pacific Railway and Anaconda Forest Products Company. Principal concentrations of these ownerships are on the east side of the working circle. State and other private lands occur mainly along the main drainage with one concentration of state lands in Camp and Reimel Creeks of the Sula Block. (See appendix map B.)

The Piquett Creek Experimental Forest, formerly located on the West Fork Block, has been abandoned. The Lick Creek area, Compartment No. 77, will continue to serve as a principal study area for experimental purposes under a Memorandum of Understanding between the Intermountain Forest and Range Experiment Station and the Bitterroot National Forest. Several studies on growth and management practices have been conducted here over the past years.

Bitterroot Forest personnel will cooperate with the Missoula Research Center in administering sales procedures on the study areas. Cutting practices on these areas will be under the general advice of the Intermountain Station in order to meet planned objectives. Forest products removed from the Lick Creek area will be considered as part of the allowable cut.

TABLE 1 - AREAS BY LAND CLASSES AND OWNERSHIPS 1/

Ownership	Total Area	Non-forest Land	Forest Land				
			Total	Non-com'l	Commercial		
			-Acres		Total	Stocked	Nonstock.
<u>Nat'l Forest</u>							
Nonreserved	774676	30947	743729	34416	709313	696871	12442
Reserved	799950	89684	710266	301273	408993	394331	14662
<u>State</u>	17809	1363	16446	50	16396	16247	149
<u>Other Public</u>	120	-	120	-	120	120	-
<u>For. Ind.</u>	18479	123	18356	305	18051	17968	83
<u>Other Private</u>	39219	10773	28446	125	28321	26555	1766
<b>TOTAL</b>	<b>1650253</b>	<b>132890</b>	<b>1517363</b>	<b>336169</b>	<b>1181194</b>	<b>1152092</b>	<b>29102</b>

1/ For block totals, see appendix table 2.

b. General

Some grassy areas are intermingled with timber on the lower east-side slopes of the Stevensville, Darby, and Sula Blocks. Elsewhere in the working circle, forest areas are practically continuous except for nonstocked burns that have occurred in recent years. Three thousand acres were burned over in 1960. Another 4,500 acres of productive timberland in Rye Creek and Medicine Tree drainages acquired in the early forties from The Anaconda Copper Mining Company and Northern Pacific Railway also are poorly stocked as a result of heavy cutting.

Soils and climate are favorable for timber production over most of the area, but moisture is a critical factor throughout the working circle. This is pronounced on south slopes and in the eastern portion of the working circle. Many of the more severe sites will produce timber only over a long rotation. Some of these marginal sites may be of greater value as soil and watershed cover than for timber production. Soils vary greatly in composition and depth throughout the working circle. Parent material generally consists of decomposed granite.

c. Growing Stock - Area

Distribution of growing stock by types and size classes is shown in table 2. Lodgepole pine is the most extensive type, followed by Douglas-fir, ponderosa pine, and spruce, in order. Alpine fir and whitebark-limber pine occupy a sizable acreage but are of minor importance. Larch, of commercial quantities, is found only on the Stevensville Block.

Age-class distribution is not ideal (appendix table 18). There is a shortage of acreage in the younger age classes from 1 to 80 years, and an overabundance of growing stock over rotation age. Over 40 percent of the forest land is comprised of stands of rotation age and older. The same is true of size-class distribution wherein sawtimber represents approximately 51 percent of the commercial area; poles 34 percent; seedling and saplings 13 percent; and nonstocked 2 percent.

Age and size distribution within types is not good either. There is a preponderance of overmature timber in all types and a decided void in young age classes, particularly 1-20 and 41-60 age classes of spruce, subalpine fir, and ponderosa pine. The condition in each type can be improved by clear cutting older stands as rapidly as possible (within allowable cut limitations), and restocking understocked and nonstocked areas as rapidly as possible. A large portion of the cutover and nonstocked area will have to be accomplished by artificial regeneration since natural regeneration generally has failed in the past. The large lodgepole pine acreage of young growth gives the appearance of making up for shortages in young growth of other types, but much of this acreage is stagnated and unthrifty.

Planting surveys are needed to determine what portion of the nonstocked and understocked areas are suitable for planting. The acreage in this classification, as determined by photointerpretation (table 2), will

probably need adjusting. Further examination of areas in seedling and sapling and pole stands should be accomplished in order to ascertain needs for thinning and release.

Thrift and vigor is highly variable but generally poor. The lodgepole pine and Douglas-fir stands are in poor growing condition. Many acres in the younger age classes are overstocked and suppressed to the point of stagnation. Dwarfmistletoe infection is also widespread in both Douglas-fir and lodgepole pine, causing loss in growth and lowering of quality.

The mountain pine beetle epidemic of the 1920's and 1930's destroyed practically 100 percent of the mature lodgepole pine. Dead volumes in residual stands of this type just about equal its live volumes.

Site qualities for most types average between medium and poor. For the Douglas-fir the site is definitely poor (appendix table 19). Most species lose their thrift at an early age on poor sites and on south and west aspects.

TABLE 2 - COMMERCIAL FOREST LAND BY TYPE AND SIZE CLASS <sup>1/</sup>  
(NONRESERVED NATIONAL-FOREST LAND)

Forest Type	Stand-size Classes						Percent
	Sawtimber	Poles	Seedlings & Saplings	Subtotal Stocked	Non-stocked	Total	
Acres							
Douglas-fir	177,920	24,626	3,994	206,540	1,651	208,191	29.4
Ponderosa pine	119,761	13,106	1,137	134,004	1,467	135,471	19.1
Lodgepole pine	667	191,788	83,084	275,539	7,505	283,044	39.9
Whitebark-limber pine	5,284	3,933	. 108	9,325	127	9,452	1.3
Subalpine fir	10,032	9,639	1,191	20,862	375	21,237	3.0
Spruce	43,592	1,145	1,706	46,443	1,317	47,760	6.7
Larch	3,099	565	494	4,158	-	4,158	0.6
SUBTOTAL	360,355	244,802	91,714	696,871	12,442	709,313	100
PERCENT	50.8	34.5	12.9	98.2	1.8	100.0	

<sup>1/</sup> For block totals see appendix table 3.

d. Growing Stock Volume

Volumes in the primary growing stock are shown in appendix tables 4 and 8. Table 3 shows net board foot volumes (Scribner C) for trees 11 inches d.b.h. and larger. The estimated total volume on all nonreserved national-forest lands in the working circle is 3,459,681 M board feet,  $\pm$  207,580 M board feet. This is almost three times greater than volume shown in the 1957 plan (911 MM board feet). The difference is largely attributable to more reliable area and volume data than those used in the 1957 plan.

Further breakdown of volume by forest types is shown in table 4. The Douglas-fir type accounts for the greatest share of volume followed closely by the ponderosa pine type. Spruce, lodgepole pine, larch, sub-alpine fir and whitebark-limber pine are next in order.

There is an estimated 320 MM board feet of sawtimber on other ownerships. State and industrial private together make up approximately 60 percent of this amount and other private about 40 percent. Private lands contain the bulk of the higher site classes. This is mainly in the ponderosa pine type.

The quality of timber in Douglas-fir and lodgepole pine is considerably below the regional average. Ponderosa pine is average or above, and spruce is about average as judged by inventory samples.

The inventory also shows volume in terms of cubic feet (appendix table 11). Two portions of the growing stock are shown in this manner--that in pole-size trees between 5 and 11 inches d.b.h., and that in sawtimber sizes over 11 inches d.b.h. Volumes shown are inside the bark between a one-foot stump and a four-inch top.

The only pole volume presently available for cutting is that in mature stands subject to clear cutting, and that in immature stands which can be thinned.

An estimated 3,890 M cords of salvable dead and usable cull material on national-forest lands could be utilized if market conditions materialize (appendix table 21). The only use at present is as fuelwood and a minor amount of saw logs and pulpwood.

TABLE 3 - VOLUME OF LIVE SAWTIMBER BY SPECIES AND OWNERSHIP 1/  
 (In Pole and Sawtimber Stands - Stocked Nonreserved Commercial Forest)

Ownership	Area	Volume of Sawtimber by Species					Total
		P	L	D	S	MBF (Scribner)	
Nat'l Forest	605,157	815,695	28,500	1,542,124	543,189	268,640	14,103
State	15,171	43,365	760	41,542	2,774	2,244	-
Other Public	120	60	-	312	-	3,582	3,459,681
Forest Ind.	17,918	15,758	1,125	61,423	9,106	7,254	94,267
Other Private	24,237	47,361	1,085	59,243	6,082	6,203	456
<b>TOTAL</b>	<b>662,603</b>	<b>922,239</b>	<b>31,470</b>	<b>1,704,644</b>	<b>561,151</b>	<b>281,662</b>	<b>14,103</b>

1/ For block totals see appendix table 4

TABLE 4 - VOLUMES OF LIVE SAWTIMBER BY TYPES AND SPECIES 1/  
 NONRESERVED COMMERCIAL NATIONAL FOREST LAND

Forest Types	Area	Volume of Sawtimber by Species					Total
		P	L	D	S	MBF (Scribner)	
D	202,546	128,529	-	1,102,138	-	24,902	89,612
P	132,867	686,274	-	358,639	24,922	16,603	8,312
LP	192,455	-	-	61,410	154,942	100,393	94,668
WLP	9,217	-	-	-	4,770	3,894	3,156
AF	19,671	-	-	-	14,495	16,763	12,222
S	44,737	-	-	12,599	337,431	104,306	38,333
L	3,664	892	28,500	7,338	6,629	1,779	1,127
<b>TOTAL</b>	<b>605,157</b>	<b>815,695</b>	<b>28,500</b>	<b>1,542,124</b>	<b>543,189</b>	<b>268,640</b>	<b>14,103</b>

1/ For block totals see appendix table 8.

#### 4. MANAGEMENT OBJECTIVES

The major objective will be to manage the forest resources of the working circle for the most appropriate use or uses, to gain maximum productivity, desirable composition, and the highest quality of forest products suitable for existing economic conditions and local markets. Present forest industry is based on sawtimber production. Production of sawtimber will be given primary attention. Secondary consideration will be given to the production and utilization of other products as they become of more importance to the economy.

The sawmill capacity of the Bitterroot Valley is estimated to be 55 MM board feet. Four mills in the Darby area alone are capable of producing 45 MM board feet. The balance is spread about equally between 6 smaller mills in and adjacent to Hamilton. This volume exceeds the annual allowable cut of sawtimber for the working circle. All sawmills in the valley are favorably situated to bid on sales at any location in the working circle and strong competition for sale offerings is prevalent.

The principal objectives may be reached as follows:

##### a. Community Stabilization

- (1) Provide industry the opportunity to obtain a steady supply of raw materials within the allowable limits.
- (2) Encourage establishment of manufacturing facilities that will increase utilization of forest products not now being used because of size and quality.
- (3) Continue to discourage use of temporary logging camps.

##### b. Marketing Program

- (1) Program sales and cutting to meet the more urgent silvicultural needs, insect and disease control, and salvage problems.
- (2) Design sale sizes to meet the needs of industry within the limits of allowable cut and needed silvicultural measures.
- (3) Keep industry informed of sales program and cutting objectives.

##### c. Silvicultural Practices

In order to obtain maximum quantity and quality of high value products, correct and timely silvicultural practices must be applied. The most highly valued timber types in this working circle are best managed as even-aged stands. This objective can best be obtained by clear cutting, followed by scarification and/or burning. It is particularly true in the Douglas-fir and lodgepole pine types where dwarfmistletoe infection is a prime consideration. Ponderosa pine will also be cut according to these principles. This will provide for capturing the maximum amount of mortality as well as producing even-aged stands.

The practice of clear cutting in the Douglas-fir type was started in 1958 and 1959. Prior to that time, a modified selection cut was practiced in this type. This actually amounted to a diameter limit cutting, which has since proved undesirable in view of the heavy dwarfmistletoe infection present in these stands, and other detrimental effects. Conditions of stand composition, thrift, age, erosion, and conflict with other uses will be considered in arriving at the best silvicultural practice to be used.

Management objectives for each timber type are outlined in Regional Marking Guides (FSH 2442.8). These guides constitute approved regional policy. The general objectives will be to harvest the timber crop in such manner as to:

- (1) Obtain maximum utilization of the forest crop designated for cutting.
- (2) Obtain natural reproduction within 3-5 years after removal of the timber.
- (3) Produce species best suited to site, and improve quality through stand improvement measures.
- (4) Bring existing and potential forest lands to their optimum stocking and production in as short a time as possible.
- (5) Reduce the hazard incident to growing the next crop of timber.
- (6) Give priority of cutting to mature and overmature stands.
- (7) Manage for an equitable distribution of age classes.
- (8) Utilize the full allowable cut of the working circle.
- (9) Coordinate timber use with all other key uses.

## 5. COORDINATION WITH OTHER USES

All resources of the working circle will be managed in accordance with multiple-use principles. Land-use plans will determine priority of key uses. (Refer to FSM 2412.1 and FSH 2413.2.)

### a. Water

One of the paramount contributions of national forests to the western economy is water. All national-forest lands, whether forested or open range, have important watershed values. The watershed will be managed to maintain or improve the existing soil mantle, and to protect streams from siltation, scouring, and pollution. An acceptable vegetative cover will be maintained to insure a comparatively uniform streamflow.

Quality water is extremely important to the economy of the Bitterroot Valley. Without the water stored in forested mountains that surround the Bitterroot Valley, agriculture as an industry would not be possible. Water is the lifeblood for farmers in the valley. More than 130,000 acres of farmland in the valley bottom are dependent upon irrigation water for crops that could not survive on an average precipitation of 11 inches annually. Most of the precipitation falls during the off-growing season. It is estimated that 475,000 acre-feet of water are used each year to irrigate the farmland within the valley.

Timber production and water use will be coordinated by:

- (1) Controlling timber harvest operations which will affect stream channels and areas of high erosion potential.
- (2) Controlling road construction and logging methods and thus minimize rapid surface runoff, erosion, and stream silting. Roads and skid trails will be located away from streams and out of draws whenever possible.
- (3) Restocking denuded and poorly stocked national-forest lands.
- (4) Using silvicultural systems that will result in maximum water storage and uniform runoff insofar as possible.
- (5) Giving special consideration to surface sources of water for domestic use.

b. Wildlife

The Bitterroot River and all its tributaries provide excellent trout fishing. There are approximately 550 miles of readily accessible streams and 120 lakes. Most lakes are located in the subalpine regions. Big game is abundant. Large herds of deer and elk are found on the Bitterroot Forest. There are a limited number of moose, goat, and bear.

Big game populations on the working circle are generally at the maximum level that winter ranges will support. There appear to be a few areas in which competition between big game and domestic livestock exist. This is the result of a buildup in big game numbers with light harvests, retention of the Skalkaho Game Preserve, lack of hunter access across private lands to national-forest land, poor distribution of game, and the established early-day practice of grazing livestock on the timbered transitory ranges.

The Montana Fish and Game Department has purchased approximately 2,800 acres of private land for winter game range in the vicinity of the St. Clair and Gird Creek drainages adjacent to the national-forest boundary. This will afford greater hunter access and add to acreage of suitable winter game range. This agency, along with the Forest

Service, is making every effort to abandon the Skalkaho Game Preserve. Abandonment of the preserve would permit harvest of big game animals in this area, thereby alleviating the problem.

Timber along fishing streams will be harvested in a manner that will not impair this resource. Wherever possible, roads paralleling streams will be constructed far enough back from streams to permit a filter of forest cover between stream and road. This area of forest cover will also provide shade for trout.

Road construction will be done in a manner to keep as much debris out of the streams as possible. Streambank disturbance will be kept to a minimum.

Lodgepole pine and Douglas-fir types will be clear cut in blocks of various sizes in a checkerboard fashion, so that uncut timber surrounds each clear-cut area. This practice has several advantages in wildlife management. It provides much "edge type" and ideal habitat for big game and upland game birds, and a desirable combination of feed and cover for both classes of game.

The silvicultural systems prescribed favor wildlife. The browse supply will be more abundant and timber borders or "edge" will increase the food supply for game birds. The ponderosa pine type provides the majority of the area available for winter game range.

On areas of key critical big game winter range, sales programs will attempt to provide a continuing area in clear-cut blocks. This will tend to stimulate new browse production.

Timber access road construction programs will make accessible large hunting areas to both hunters and fishermen. Since the harvesting of game is one of the essential phases of game management, the building of roads will enhance game management.

#### c. Recreation

Recreation attractions are plentiful within the working circle, including many lofty snow-capped peaks and scenic timber-covered slopes. There are two large wilderness areas within and adjacent to the working circle. Other recreation attractions are a winter sports area, three developed hot springs, and one undeveloped warm water spring. Summer home sites are limited.

With such recreational attractions, the present use is heavy and is expected to increase materially in the future. At present there are fourteen developed camp and picnic areas in the working circle. A recently completed recreational survey indicates that twenty more developments will be needed in the near future. Recreational visits in 1960 were estimated at 110,400. Visits have been increasing at approximately 9 percent annually over the past five-year period.

Servicewide policies applying to management of timber on recreational areas will be followed (FSH 2312.32). In general, when timber sales are made within or adjacent to these areas, cutting methods, logging practices and road locations will be modified to promote safety and not unnecessarily impair recreational values.

On recreation areas, the maintenance of vegetative cover in an attractive condition is of prime importance. Cutting plans for these areas will provide for an orderly removal of deteriorating trees when needed and tending of immature stands in a manner that will fully protect recreational values. In unimproved recreational areas, needed cutting will be done in advance of development.

Recreation plans have been prepared covering four ranger districts within the working circle. The information in these plans, together with regional multiple-use guides, will be considered in determining timber utilization and logging methods in areas where recreational values are involved.

d. Grazing

The livestock ranges within the working circle are primarily transitory with a small acreage of open grassland on the east side of the Darby and Sula Blocks. Stocking of the range is being done on the basis of estimated capacities for each allotment until such time as range allotment analysis is completed for the forest. Presently, all available range appears to be stocked to capacity and until the analysis program is completed, maximum livestock use will be limited to the 1960 level. No new grazing permits will be issued for transitory range or permanent types until range allotment analysis is completed.

Use of the range by both big game and domestic livestock has been heavy over the past years. Some of the early day permits issued for transitory range were preference permits. Local cattlemen have come to depend upon this transitory range to round out their operations. This is especially true in the West Fork Block and on west side areas of the Darby and Stevensville Blocks. The quality of the range is poor and it furnishes only limited amounts of suitable forage for domestic stock. Nonetheless, the demand for it is high and has been increasing in recent years.

On lands where timber production is the key value, domestic grazing will be eliminated from plantations and areas prepared for natural regeneration until the reestablished stand is of such size that damage will not result from grazing. Restrictions will be removed as soon as practical after establishment of the stand. Increased carrying capacity gained by timber harvesting will be considered temporary, and will be used to relieve overstocked allotments, but only if such grazing will not be a deterrent to timber production.

e. Mining

The working circle has many mining claims in existence, most of which are unpatented. There is only one known mine that is producing minerals in paying quantities. It is the fluorite mine located southeast of Darby on the Rye Creek Divide. Full scale operations began here in 1953 and have continued to the present day. Considerable prospecting for fissionable material has been done, but no discoveries of any

consequence have been made. Surface rights determination has been made on all but approximately 5,000 acres of the working circle. Some rights-of-way problems or claims are anticipated, but are not fully determined at this time.

f. Research and Administrative Studies

There are no experimental forests on the Bitterroot Working Circle at the present time. The Piquett Creek Experimental Forest, on the West Fork Block, was abandoned in 1960. The risk-rating studies started there in 1958 will be continued by agreement between the Bitterroot National Forest and the Intermountain Forest and Range Experiment Station.

The Lick Creek Area, in compartment No. 77 of the Darby Block, will continue to be used as a study area for testing timber cutting practices in the ponderosa pine type. Cutting operations on a selective cut basis were started here in 1907, and it presents an excellent opportunity to study the growth and establishment of new stands over a 50-year period. A great deal of valuable information on management has been gained by these studies and more will be provided in the future. Studies consist of 87 growth plots, a series of thinning, pruning and release plots, and various cutting methods, ranging from light selective to clear cutting in ponderosa pine.

The research program is being conducted by the Intermountain Forest and Range Experiment Station under a memorandum of understanding with the Bitterroot National Forest.

An intensive compartment examination of this compartment will also be made during 1962.

All forest products removed from the above study areas will be considered part of the allowable cut for the working circle.

Other administrative studies of value in timber management practices, particularly as they relate to areas of other uses, are as follows:

- (1) A series of three exclosures in a ponderosa pine plantation to study relationships of domestic grazing to tree survival in the Guide Creek clear-cut block.
- (2) A series of three exclosures on Dick Creek; one high-fenced area for game, one low-fenced area for cattle, and one open control to compare range grazed by wildlife, wildlife and cattle, and ungrazed.
- (3) A one-fourth acre game enclosure in Spring Gulch to show difference between range grazed and ungrazed.
- (4) A soil survey of the Lick Creek area would be desirable.

## 6. REGULATION

### a. Rotations

Rotations recommended for each of the various types are as follows:

Douglas-fir and larch	160 years
Ponderosa pine, spruce, subalpine fir	140 years
Lodgepole pine and whitebark pine	120 and 100 years

The lodgepole pine type will be managed on two rotational ages; that acreage which is on medium and good sites will be managed for sawtimber at 120 years; that on poor sites, which is about 50 percent of the total, will be managed for other products on 100-year rotations.

The end product for the bulk of the Douglas-fir, ponderosa pine, larch, spruce and subalpine fir volume is lumber. The above rotations will produce maximum mean annual increments of final harvest products.

Many of the existing stands will have to be carried well beyond the recommended rotation age before they are cut. Lack of access roads, irregularity of age classes and other factors contribute to this condition. Age-class distribution alone forces harvest cuttings to remain in overaged timber for the major portion of the rotation.

### b. Cutting Cycles

Except for a small acreage planned primarily for uses other than timber production, the timber types in the working circle will be brought under even-aged management. Cutting cycles between harvest cuttings will therefore be the same lengths as the rotations.

Intermediate cuttings designed to stimulate growth of young stands generally will recur at 15-to 20-year intervals--the period following release when growth response is best.

### c. Growth and Mortality

Measure of growth and mortality is important in gauging current levels of production, allowable cuts, and in estimating future potentialities. Past growth rates and mortality, as well as future potentialities, are shown in table 5.

Net periodic growth has been relatively high during the past 10 years (1951-1960) despite an excess of mature and overmature growing stock. This is rather unusual. Normally, mortality is high enough in overaged timber to keep net growth rates low. In this case, old-growth losses were low, and annual growth rates, as determined from inventory boring data, actually exceeded the allowable annual cut rates recommended in the plan.

TABLE 5 - PRESENT AND POTENTIAL GROWTH OF SAWTIMBER AND OTHER PRODUCTS  
NATIONAL FOREST

Growth Expression	Sawtimber		Other Products		
	/ acre/year	Total	/ acre/year	MCF	Total M cords 3/
Periodic Annual Increment (Net) Past 10 Years 1/	79 2/	47,593	9.1	5,495	61,055
Ave. Annual Mortality (Past 5 Years)	9 2/	5,631	1.1	650	7,222
Sustained Yield Capacity 4/	121	85,549	22.8	16,172	179,687
Realizable (70% Normal)	85	60,019	15.9	11,269	125,210
MAI From Present Stands	37	27,326	2.6	4,782	53,131

1/ From inventory data taken in 1958, 1959 and 1960.

2/ Rate for sawtimber and pole strata only - 605,157 acres.

3/ 90 cubic feet = 1 cord.

4/ From "Tables of Yield and Mean Annual Increment of Fully Stocked Stands in Major Forest Types in Region One." U.S. Forest Service, Missoula, Montana, 1957. Prorated against total commercial forest acreage of 709,313 acres.

Though currently high, there is no assurance that net growth rates will remain so. Periodically, epidemics occur in one species or another to seriously deplete old growth volumes and reduce net growth rates for the period. All overaged growing stock in the working circle is subject to such losses. Only if mortality can be held to current levels can growth rates be expected to remain the same in the future.

Growth potentials in the working circle are not high. Appendix table 19, showing site potentials for the various types, indicates that all major types except ponderosa pine are below the regional average. Ponderosa pine is only average. Douglas-fir and lodgepole pine, the most extensive types, are far below average.

No great growth response can therefore be expected no matter what is done, although betterment of stocking in young stands growing on the better sites can show some overall gain in volume production, particularly if combined with capturing anticipated mortality. Stocking is excessive on much of the pole, seedling and sapling acreage, especially in the Douglas-fir and lodgepole pine types, and some of it is beyond help, due to stagnation.

d. Methods of Cutting

Regional marking guides will be used to guide cuttings in all types (see FSH 2442.8). Regional guidelines covering intermediate cuttings and thinnings have been revised recently and should be referred to when available.

Methods called for by these guides will be coordinated with all important land uses and adjusted when necessary to accommodate those uses. They will be supplemented by specific marking instructions for each timber sale area.

e. Allowable Annual Cut

Several regulatory methods were used in arriving at the allowable annual cut. They were (1) Kemp formula, which basically regulates area; (2) Austrian formula and (3) Hanzlik formula which regulates volume through consideration of both growth and volume of growing stock; and (4) Von Mantel formula which regulates volume through consideration of growing stock alone. In addition, the most reasonable level of allowable cut found with these methods was tested against the quantity of growing stock and expected growth in the working circle to see how applicable it would be. This test, called the "Tabular Check" (appendix table 22) might be considered a fifth method. It also showed the rate of cutting in terms of area and the average rotation that would result.

The various methods show a wide range of allowable annual cut (Table 6). The volume to cut by the Kemp formula comes closest to that indicated by the Tabular Check, although the area to cut by this formula appears high. It is even more out of line when compared to strict area control (See table 6). The main reason for this divergence is the imbalance between lodgepole pine sawtimber acreage and the acreage of smaller size classes. The ratio is nearly fifty to one.

Methods based on growth (Austrian and Hanzlik) are low due to the low mean annual growth shown by present sawtimber stands. Should periodic annual growth have been used in the formula instead of mean annual increment, the allowable annual cuts by these methods would have been high.

Under the circumstances, it seems best to use as allowable annual cuts the most appropriate area and volume combination shown by the Tabular Check method, which is 44 MM board feet of sawtimber and 2.2 MMCF of other products from about 4,700 acres to be clear cut annually. In addition to this volume, another 2.3 MMCF will come from clear cutting about 2,000 acres annually by lodgepole pine type capable of producing pulpwood only.

TABLE 6 - ANNUAL ALLOWABLE CUT OF SAWTIMBER AND OTHER PRODUCTS  
(All Types and Species)

Regulatory Method	NATIONAL FOREST LANDS			
	Area and Volume to Cut Annually			
	Sawtimber	Other Products		
	Area (acres)	Volume (MMBF)	Area (acres)	Volume (MMCF)
Kemp	5,938	42.1	2,096	4.75
Von Mantel	-	47.3	-	4.33
Hanzlik	-	39.8	-	5.33
Austrian	-	29.6	-	-
Tabular Check	4,730	44.0	-	-
Area Control	3,965	-	1,462	-

The Tabular Check analysis in the appendix shows that cutting at an annual rate of 44 MM board feet should establish a desirable average rotation age of about 140 years. It also shows that harvest cuttings will be in overaged material for virtually all of the first rotation. This is an undesirable situation, but with the age class situation as it is there seems to be no alternative.

Cutting control will apply to areas primarily. As such, the total will be 6,700 acres annually (4,700 acres sawtimber and 2,000 acres of other products only). This compares with about 5,500 acres which would be clear cut annually under strict area control. Strict area control is not feasible at this time in view of the poorly stocked stands that are available for cutting in the next few decades. However, cutting at the recommended rate is not far off the ultimate area objective.

Allowable annual cuts by types are shown in table 7. Insofar as possible, it will be the objective to reach and stay within the allowable limits for each type. Should it be impossible to cut one or more types to the allowable limit for some reason or another, consideration will be given to substituting one type, except lodgepole, for another to avoid dropping seriously below the total allowable cut. Cutting the allowable amount of lodgepole pine is going to be a problem of this sort in the near future. Under no circumstances should allowable annual cut rates be exceeded by substituting this type for another. Annual area to cut will be controlled by three major type groups; i.e., ponderosa pine, lodgepole pine, and "other."

The cut of sawtimber volume by species, or species groups, is shown in table 7. Distributions shown are expected to be obtained by adhering to the recommended cut of areas by types.

TABLE 7 - ANNUAL ALLOWABLE CUT BY BLOCKS  $\frac{1}{2}$ , TYPES, AND SPECIES FOR NEXT 10 YEARS  
 - NATIONAL FOREST LANDS -

Kind of Cutting	Area, to Cut				Volume by Types						Other Products	
	P	L-D	S-AF	IP-WLP	Total	P	L-D	S	AF	IP-WLP	Total	
<b>Stevensville Block</b>												
Final Harvest	200	300	100	-	-	-	-	.9	.3	-	6.3	297
Intermediate	100	100	-	-	-	-	-	.1	-	-	.2	63
Final Harvest	550	500	200	50	500	200	50	3.4	.9	.3	-	-
Intermediate	150	200	-	-	-	-	-	.1	-	-	-	-
Final Harvest	250	600	150	150	600	200	50	4.1	5.3	1.9	.6	12.3
Intermediate	50	200	-	-	-	-	-	.1	.3	.1	.4	153
<b>Darby Block</b>												
Final Harvest	1,300	650	1,300	650	1,300	650	1,300	4.1	.3	-	-	-
Intermediate	-	-	-	-	-	-	-	.1	-	-	-	-
<b>Sula Block</b>												
Final Harvest	1,150	600	1,150	600	1,150	600	1,150	2.3	5.7	1.3	.5	6.6
Intermediate	-	-	-	-	-	-	-	.2	.2	.1	.2	.5
<b>West Fork Block</b>												
Final Harvest	100	1,650	250	250	100	1,650	250	4.2	7.6	1.9	.6	.7
Intermediate	350	800	50	50	350	800	50	.1	.4	.1	-	.2
<b>Working Circle</b>												
Final Harvest	300	4,700	700	700	300	4,700	700	15.0	19.0	7.0	1.0	2.0
Intermediate	1,000	2,300	100	100	1,000	2,300	100	.3	.1	.1	.1	.5
Total	1,300	7,000	800	800	3,000	7,000	800	15.3	20.0	7.1	1.1	2.5

<sup>1</sup>/ The Magruder Block is entirely within the Selway-Bitterroot Primitive Area and is not being managed for commercial timber production. It, therefore, has no allowable annual cut.

Compared to reaching the allowable cut in area by types, reaching the indicated volume by species is of secondary importance. However, it is an objective nevertheless. To overcut one species of high demand to compensate for another that probably will be undercut is highly undesirable and will not be practiced except for most urgent reasons. Compelling reasons may consist of major fires, windthrow, epidemics or other catastrophies seriously affecting the economy of the working circle. It should be remembered that to strive for and reach one of the regulatory prescriptions and to violate or ignore another is not as good management as coming close to both objectives.

Separate allowable cuts have been determined for each type (Appendix Table 22) and for two portions of the growing stock within each type, i.e., the sawtimber portion (trees 11" d.b.h. and over) and the pole portion (trees 5" to 11" d.b.h.). Volumes of the latter are listed under other products.

It should be noted from appendix table 22, Kemp formula, that only one-half the lodgepole pine acreage is considered productive of sawtimber. The remainder is too low in site quality or too stagnated to produce such products. This fact, together with the large acreage of lodgepole pine type, has a strong effect on the allowable cut of each product.

Cutting control will apply to the working circle rather than to the individual blocks or districts, however, since administrative control is by ranger districts, a share of the total cut is assigned to each district (Table 7). Allocation of the cut to districts may not continue on this basis but will be subject to change periodically by the forest supervisor.

The regulated volume of other products, indicated in table 7 as 2.2 MMCF, pertains to the removal of material below sawtimber size. Removal of this material usually is urgent since it helps prepare cutting areas for establishment of new stands. Harvest of other products will be a timber sale requirement whenever and wherever utilization has proven feasible on other similar sale areas.

The aforementioned cuts do not consider volumes that might be harvested as thinnings, improvement cuttings, or other intermediate cuttings. Few such cuttings have been made to date in this working circle, however, there are strong indications that market for products of small size will soon develop and sales can be made of this class of material in the near future. It is desirable therefore to establish cutting objectives in immature stands at this time. Appendix table 23 shows areas of dense young stands in the pole- and young sawtimber-size classes that should be treated annually, together with volumes that may be removed in such cuttings. Areas to be treated annually should be stressed rather than volumes to be obtained in such operations.

Under good market conditions the area to be given intermediate cuttings is 2,300 acres--about half as much as for sawtimber. From it an estimated 2 MM board feet of small sawtimber and 540 MCF of other products should

be obtained. This volume of small material is in addition to that which is removed as harvest cuttings. No reduction in volume of harvest cuttings is anticipated as a result of the preliminary cuts. For the present, the calculated allowable cuts from young stands should be considered cutting objectives rather than maximum allowances. A number of years probably will have to elapse before the full cut from intermediate cuttings can be disposed of.

Control of allowable cuts will be by ten-year periods since it is impractical to regulate cuts closely year by year. Control will require that the cut will not exceed 10 percent of the allowable cut for a ten-year period and will not overrun the allowable by more than twenty-five percent for any one year. Any accumulated undercuts must be liquidated according to the above provisions, and will not be carried forward into the next plan period.

An allowable cut of salvage products has not been determined, nor is regulation of these products planned. The perishable nature of this material makes it desirable to harvest it as rapidly as possible. Quantities available are shown in appendix table 21.

In controlling the cut it is important to charge the volume cut to the right allowable cut category. Volumes secured from a harvest cut cannot be charged against the intermediate cutting allowance, or vice versa. Neither can size of timber be ignored. Should any substantial amounts of sound sawtimber volume be harvested as poles, posts, or pulpwood, such volumes must be charged against the sawtimber allowable cut rather than against other products. A large volume of lodgepole pine is apt to be harvested this way. (See Volume and Area Control FSH 2444.5)

The sustained cut from other ownerships within the working circle boundaries is estimated to be about 5 MM board feet of sawtimber and 450 MCF of other products. This is divided about equally between state, industrial private, and other private ownerships.

#### f. Cutting Budget

The cutting budget for the first five years of the plan is shown on Forms R1-2410-7, "Proposed Cut and Sell Plans" and R1-2410-8, "Timber Access Roads" in the appendix tables 25a and 25b. Annually, each ranger will revise the budget by dropping the year about to close and adding another so there will always be a continuous budget of items for five years ahead.

The cut and sell plans were prepared before information concerning the annual allowable cut for the working circle under this management plan was available. They will be revised as needed to keep them current and in accordance with the approved allowable cut and silvicultural objectives of this plan.

## 7. SALES POLICY

### a. Size of Sales

No fixed limit on size of sales will be established. Sale size will vary according to (1) silvicultural objectives, (2) salvage needs, (3) needs of local industry, (4) development costs for roads and other improvements, and (5) the desirability of selling natural logging chance as a unit.

Much of the working circle is still in need of development and this factor will have the greatest bearing in determining sale size. In some cases appropriated funds will be needed to furnish access into areas containing large volumes of low-value species. This is particularly true in relation to the large acreage of lodgepole pine. Until such funds are available, it will be necessary to make sales of a size that will allow for amortization of development costs. This makes some fairly large sales a necessity. In some cases, the high volumes of low-value species in combination with average to high road costs may result in a lower class of road being built than is called for in the transportation plan. Insofar as is possible, sales will vary in size to meet the needs of both large and small operators. A policy of short-term sales will continue to be the rule. The volumes of most sales will be in the 2 MM to 5 MM board feet class.

### b. Point of Manufacture

No restrictions will be placed on the point of manufacture. The movement of forest products is toward Darby and most of the manufacturing of these products is accomplished in the Bitterroot Valley. Four sawmills of comparable size are located there. All of the above mills have finishing facilities except the Intermountain Lumber Company mill. Green lumber from this mill is hauled to Missoula by truck for finishing. As a rule, timber will be appraised to Darby, Montana. However, a few of the sales located in the Stevensville block will be appraised to Missoula, it being the nearest point of complete manufacture. Competition for logs in the working circle can be expected to increase from the Missoula area mills.

### c. Merchantability Specifications

Utilization standards applicable to the working circle are included in FSH 2432.23. The long range policy will be to secure maximum utilization of forest products consistent with current market conditions, distances to market, and other economic factors (FSM 2411.3). The gauge of merchantability will continue to be the size and type of product which can be removed by an efficient operator for a reasonable profit. Products which will not return a reasonable profit will not be removed unless necessary for silvicultural reasons.

Principal product removed from the working circle is saw logs with lumber as the end product. Less than one percent of the timber goes into other products of posts and poles.

d. Logging Methods

Logging methods will be limited to those which fulfill the requirements of Regulation S-2 and meet the objectives defined in the timber sale contract. Present logging methods consist of tractor or jammer skidding and truck hauling. Other methods may be permitted or required where experience proves them to be acceptable. Special clauses will be added to the timber sale contract prior to advertisement to cover areas of highly erodible soils, steep slopes, municipal watersheds, pole stands, and recreation areas as conditions warrant.

e. Christmas Trees

Christmas tree sales will be made in areas where they will benefit the stand and can be financed. They will be coordinated with stand improvement measures and used to improve composition and spacing of stands.

f. Other Products

Other products, fence posts, small poles, round pulpwood, and stud logs will be sold as market for them develops and their removal meets silvicultural requirements.

8. FOREST DEVELOPMENT

a. Transportation

(1) Present System - An active branch line of The Northern Pacific Railway extends from Missoula to Darby with sidings located at most of the smaller towns between.

U.S. Highway No. 93 bisects the working circle in a north and south direction. State Secondary Highway No. 269 also parallels the northeast side of the working circle from Stevensville to Hamilton where it joins Highway No. 93. State Highway No. 38, extending from Grantsdale over the Sapphire Range to Rock Creek, has eight miles of oiled surface. It is suitable for log hauling from approximately two miles above the junction of Daly Creek and the South Fork of Skalkaho Creek.

There are two partially completed main access roads that branch off of Highway No. 93, one at the East Fork (Project No. 93) and the other (Project No. 91) on the West Fork of the Bitterroot River. There are numerous sections of county and private roads connecting to the main highways. Many of these will be needed for timber hauling and all-purpose forest access.

(2) Utilization Road Needs - The most important need is funds for completing main access roads and procurement of rights-of-way that will allow for full development of the interior road system. The current approved transportation plan, dated June 30, 1960, indicates the following existing and planned mileage of roads for the working circle:

SYSTEM ROADS FROM TRANSPORTATION PLAN

Status	Block				Total
	Stevensville	Darby	Sula	West Fork	
Miles					
Nonexistent (needed)	468.5	777.1	737.5	1,103.9	3,087.0
Primitive Existents	10.0	37.0	8.9	25.0	80.9
Existents Satisfactory	176.3	200.2	182.1	222.3	780.9
<b>TOTAL</b>	<b>654.8</b>	<b>1,014.3</b>	<b>928.5</b>	<b>1,351.2</b>	<b>3,948.8</b>

1/ In addition to the above approved system mileage, there are 3,570 miles of "banked" Land Use roads that are needed to complete the road network for the working circle.

(3) Policy - The policy will be to construct access roads into each compartment to facilitate desirable silvicultural practices, adequate protection, and orderly harvest of forest products. Main trunk roads which involve larger investments and serve more than one compartment should be constructed with appropriated funds insofar as possible. Other roads will be constructed by timber sale purchasers. If appropriated funds are not available and timber values or volumes are not sufficient to amortize planned road development costs, stage construction will be necessary.

Roads considered for construction with appropriated funds are as follows:

Name	Number	Miles
Skalkaho-Rye	75.2	16
Skalkaho Highway	"	8
Paint Creek	"	8
South Fork Rye Creek	"	7.5
Sleeping Child	"	14
West Fork	91.6 & 91.7	13

All roads will be constructed in accordance with current instructions contained in Region One "Criteria for Forest Development Roads as Guides for Planning Location and Design." The transportation plan, with its periodic revisions, will be the guide for designating roads to be retained on the system.

(4) Program - The "Proposed Cut and Sell Plans" (R1-2410-7), and "Timber Access Road Plans" (R1-2410-8), indicate roads and timber sale priorities by years (appendix tables 25a and 25b).

Right-of-way acquisition inventory and action plan summary is shown in appendix table 30.

b. Planting

(1) Needs - There are approximately 12,500 acres of nonstocked commercial forest land in the working circle, plus 14,000 acres of poorly stocked seedling and sapling stands. This acreage represents approximately three percent of the commercial timberland. The major portion of both areas will need to be planted if productivity and watershed management objectives are to be realized. A further analysis of plantable acreages appears under the next section in timber stand improvement.

The aforementioned acreages have been determined through aerial photointerpretation and will need further field checking and planting surveys before a firm planting plan can be formulated. Surveys will be started during 1962 with the objective of having all nonstocked areas covered by 1970. From this information, a sound, realistic planting program will be formulated. Most of the planting done to date has been by hand methods. There is a need for more research and experimentation in arriving at new and cheaper methods of artificial regeneration. Machine planting can be used on the more moderate slopes but broadcast seeding or other methods should be tried on steeper areas.

(2) Policy - Planting and planting surveys will be accomplished in accordance with regional policy. Cutover areas that are not restocked naturally after a three-to-five-year period will be planted. A careful analysis will be made of each proposed planting site to determine suitability of site, species to be planted, cost and other pertinent data. K-V funds will be collected and used for planting as necessary on cutover areas.

(3) Program - The tentative planting program is shown in appendix table 27. This will be revised annually to keep it current and care for changing priorities.

An annual average of approximately 450 acres of nonstocked area has been planted during the past three years. At this rate, it would be approximately thirty years before planting of the 12,442 acres of nonstocked area is accomplished without any consideration being

given to the 14,000 acres of poorly stocked young growth. If the needed objectives of productivity are to be met, the planting program for the working circle should be tripled in the coming ten-year period.

c. Timber Stand Improvement

The main objective will be to improve species composition, and obtain greater production of a high quality forest product on all commercial timberland insofar as production is consistent with planned use of these lands.

(1) Needs - No accurate survey nor analysis has ever been made to determine the amount of needed stand improvement for the working circle. Presently, compartment examinations have been started on the Darby Block.

Opportunities to do cultural work are reflected to some extent by the data shown in appendix tables 3, 18, and 19. Stocking by stand size is summarized as follows:

STOCKING BY STAND SIZE

Stocking	Sawtimber	Poletimber -M acres-	Seedling Sapling
Well	7.1	85.0	62.5
Medium	127.7	87.6	15.0
Poor	225.5	72.2	14.5
Total	360.3	244.8	91.7

Total nonstocked--12.4 M acres.

Some conclusions that may be drawn are:

- About one-half of the stocked sawtimber acreage of all types is rotation age or older. Therefore, regeneration cuttings are extremely high priority--particularly on the better sites.
- Assuming that all of the well stocked and one-half of the medium stocked sapling stands are in need of treatment, due to clumpiness, there would be about 70,000 acres in need of precommercial thinnings to increase productivity. First, this work will be directed to ponderosa stands and confined to medium or better sites.
- We can assume that all of the well stocked and a part of the medium stocked pole-size stands are in need of treatment. For the most part, this will be accomplished by commercial thinnings. However,

it is estimated that about 30,000 acres will require precommercial thinning which will be first directed toward the ponderosa pine type and on medium or better sites.

- o No cultural programs are anticipated on poor sites for many years yet. Many of the well-stocked young stands on poor sites as well as some on the better sites are stagnated and will need rehabilitation before these lands will produce satisfactory timber crops.
- o Reinforcement planting within poorly stocked stands and planting of nonstocked areas must be implemented even though the job is not as large as the job of tending young stands.

The greatest problem in the working circle is the stagnated, dwarfmistletoe infected small-diameter Douglas-fir and lodgepole pine stands representing about 10 percent of the commercial forest area. In many cases these stands are stagnated beyond any hope of responding to release. In actual practice much of the area should be completely rehabilitated considering the fact that the volume of green timber is equal or exceeded by volume of dead material resulting from the mountain pine beetle epidemic (1928-1932) in the lodgepole pine type, the heavy dwarfmistletoe infection, and stagnated condition of these stands. In the absence of commercial demand for products from these stands, the needed work must be accomplished with appropriated funds. This is based on the premise that no demand for the dead material is likely to develop in the near future. On the better sites, pole and seedling and sapling stands should have excess and undesirable trees removed to take advantage of anticipated growth gains.

Some of the needed T.S.I. work can be accomplished by K-V funds, but most of the problem area lies beyond timber access roads and the work will require appropriated funds. T.S.I. measures other than planting, which are needed on a larger scale, are:

- (a) Weeding in overdense young sapling stands to improve composition and spacing.
- (b) Thinning large sapling and pole stands to accelerate growth rate.
- (c) Pruning small pole and sapling stands to improve quality.
- (d) Rehabilitate cutover and nonproductive overmature stands. This includes scarification, slashing, and prescribed burning.

(2) Policy - Timber stand improvement measures will be performed in accordance with practices stated in FSM 2411, 2473, FSH 2411, 2473, and Regional T.S.I. Handbook. Practices will be supplemented by marking guides and regional policies as conditions warrant. Stand improvement funds will be diverted from stumpage on timber sale areas, in accordance with the K-V Act, to insure re-establishment of these stands.

To guard against overstocking of lodgepole pine and Douglas-fir, provisions to hold K-V funds up to 15 years will be made to allow for at least one thinning after establishment of these stands. Ponderosa pine, larch, Douglas-fir, and spruce will be favored over other associated species. Suitability of species for the site will be the determining factor in favoring one species over others in all T.S.I. work on a site. Ponderosa pine will be favored over Douglas-fir and other species on south and southwest exposures.

(3) Program - The T.S.I. program is based on a combination of appropriated funds and K-V collections available. The bulk of these funds are presently being used for thinning, pruning, removal of defective and diseased trees, and for site preparation. The current and tentative plan of work is shown in appendix table 28.

d. Disease Control

The working circle has the usual diseases affecting tree species indigenous to the area with near epidemic conditions of dwarfmistletoe infection in the Douglas-fir and lodgepole pine species. A discussion of the important tree diseases follows:

(1) Problems - Dwarfmistletoe (*Arceuthobium spp.*) infection is widespread within the working circle. Virtually every stand of Douglas-fir, lodgepole pine, and larch is infected with the dwarfmistletoe in varying degrees. It is estimated that upwards of 70 percent of the Douglas-fir and lodgepole pine contains moderate to heavy infection. No study has been made to assess the annual losses occurring. Annual growth loss in the heavily infected stands of Douglas-fir and lodgepole is estimated to be in excess of 50 percent. Reduction of losses from dwarfmistletoe is considered to be the most important forest disease problem in the working circle.

The parasite develops faster where the amount of direct sunlight is greatest. It is not a fast-spreading disease; but, nevertheless, over a period of years its total damage can be great. Opening up of lodgepole pine stands by the mountain pine beetle epidemic (1928-1932), and selective cutting of Douglas-fir stands in the past have increased the spread of the infection. Since the parasite is a light-loving organism, one of the steps in the direction of its control is to maintain closed and fully stocked stands of timber. To prevent the transmission of the parasite from the older stands to the newer stands, no two-story conditions should be fostered. Cutting the older merchantable trees and leaving the younger unmerchantable infected growth tends to increase spread of the disease. The removal of only the more merchantable dwarfmistletoe trees causes the parasite in the trees that are left to develop more vigorously, and disperse its seeds over wider area.

Clear cutting is the principal method of control and this practice will be mandatory where the disease is prevalent. Infected residual trees on a sale area should be cut or poisoned. To accomplish direct control work, K-V money will be collected on timber sale areas and supplemented by appropriated funds as necessary. Where

feasible "stand manipulation" by converting an infected stand to one consisting of species not susceptible to disease will be carried out. Chemical and antibiotic control methods should be explored more thoroughly to supplement or enhance silvicultural control.

References: Dwarf mistletoes of the Intermountain and Northern Rocky Mountain Regions and Suggestions for Control - Research Paper No. 60

Mistletoe Injury to Conifers in the Northwest - USDA Bulletin No. 360

The Mistletoes - Literature Review - USDA Bulletin No. 1242

Ponderosa pine needle blight (*Elytroderma deformans*) is present on the ponderosa pine in all four blocks of the working circle. There are heavy concentrations of the blight in the Blue Joint and Mud Creek drainages of the West Fork block and in the East Fork drainage of the Sula block. The main damage caused is the reduction in increment of older trees and killing of pole- and sapling-size timber of this species by heavy defoliation. Wet spring weather favors increase of the disease and dry springs of the past two years seem to have checked its spread. No control measures by fungicides or other means that are economically feasible are known. Indirect control, consisting of logging heavily infected timber as rapidly as possible, will be practiced wherever possible. Trees with more than 50 percent of foliage infected in years when disease is prevalent will generally be marked for removal.

Lodgepole pine needle cast (*Hypodermella spp.*) has been prevalent in varying intensities during past years. The intensity of disease varies greatly from year to year. Intensities have been lighter during the past two years. It is believed that the drier spring weather has brought this about. The disease doesn't appear to be a serious threat.

Douglas-fir needle cast (*Rhabdocline pseudotsugae*) is prevalent in varying degrees. It has caused very little direct mortality but the Christmas tree industry has experienced considerable loss through defoliation of young trees. No preventative or control measures exist.

Root rots (*Armillaria mellea* and *Poria weiri*) have caused considerable damage to several species and age classes. No practical preventative or control measures exist..

Lodgepole pine blister rusts (*Cronartium spp.* and *Peridermium spp.*) are found in varying intensities. These diseases are destructive. They are responsible for losses in lodgepole pine used for lumber or poles. The cankers provide point of entry for red rot.

Fungi (*Fomes pini*, *Polyporus schweinitzii*, *Echinodontium tinctorium*, *Fomes pinicola*, *Polyporus sulphureus* and *Polyporus anceps*) are common in overmature sawtimber. Losses from the above diseases will be reduced by shorter rotations and more rapid removal of defective trees through intensive forest management.

(2) Policy - Old growth stands will be harvested as rapidly as possible. Constant vigilance will be the watchword for detecting disease occurrence. Periodic surveys of existing diseases will be made to determine trend and extent of damages. Funds for disease control will be requested where effective control measures exist and infected timber will be salvaged wherever possible. (Reference FSM 2483.2)

(3) Program - Sale of diseased timber will be given high priority and sale program will be modified as necessary to control outbreaks and stay the spread of disease. (Reference FSM 2483.2)

(4) Develop an access road program to enable rehabilitation of small diameter, currently nonmerchantable, heavily dwarfmistletoed stands.

e. Insect Control

(1) Problem - Scattered and sporadic insect activity is prevalent throughout the working circle with the spruce budworm being present in epidemic proportions.

Spruce budworm (*Choristoneura fumiferana*) has caused considerable damage during the past and is a definite threat to Douglas-fir in the working circle. In 1951 the area of infestation was estimated to be 12,000 acres and has since increased to over 400,000 acres.

Control measures were activated in the summer of 1952 and 12,000 acres of the heaviest infested areas were aerially sprayed with DDT. The project was a success with 98 percent kill of the insects being attained. Two additional control projects have been completed since 1952--one in 1955 consisting of 169,000 acres, and another in 1959 when 126,880 acres were treated.

Spread of the infestation has been continuous over the years. Area covered in the 1959 control project is still in check, but infestation of epidemic proportions still prevails in Rye Creek, Sleeping Child, and Skalkaho drainages of the Darby block and in Nezperce, Slate Creek, Boulder Creek, West Creek, and Beaver Creek of the West Fork block. A constant watch of developments is being maintained and it is probable that a control project will be necessary in 1962 if the infestation is to be held within safe limits.

The Engelmann spruce beetle (*Dendroctonus engelmanni*) is present in the working circle in endemic proportions. This beetle is capable of multiplying at a rapid rate. Its potentialities as a tree killer are greater than any other known bark beetle in this region. It is estimated that 5 MM board feet of spruce have been killed in Signal Creek in the Stevensville block during the period from 1952 to 1955. The seriousness of any threat of the spruce bark beetle infestation in the working circle is tempered by the fact that the type is broken up into scattered patches along stream bottoms.

The Douglas-fir beetle (*Dendroctonus pseudotsugae*) is ever present in light proportion. In years past a few localized epidemics have occurred that caused serious losses, but since 1952 the infestation has seemed to decrease in severity.

The mountain pine beetle (*Dendroctonus monticolae*) has caused serious damage in the past. An epidemic of the mountain pine beetle started from Rock Creek into the East Fork of the Bitterroot in 1924. In the springs of 1926 and 1927, infested trees were treated in the East Fork of the Bitterroot to prevent southward spread, but small pockets of infestation had already occurred in the Big Hole. It continued to spread over the Bitterroot Working Circle and into the Nezperce National Forest. Mortality was extremely heavy in the older stands of lodgepole pine, while in the younger stands the mortality was lighter but still heavy enough to cause a material loss in the lodgepole pine timber volume. A large volume of ponderosa pine was also killed by this beetle during this epidemic. At present infestations are of endemic proportions, but mature and overmature timber of this species should be logged to guard against future epidemics.

The western pine beetle (*Dendroctonus brevicomis*) is present within the working circle in the endemic stage. No serious outbreaks have been observed in recent years. High risk marking in ponderosa pine stands will tend to reduce the loss of timber by this insect. As a further step towards keeping the beetle under control, the cutting budget plan will include early cutting of the extensive stands of overmature trees.

(2) Policy - Losses from insects will be held to a minimum by maintaining a constant alertness for potential outbreaks, insect activities, and buildups, and by promptly initiating control measures. Guidelines established in FSM 2411 and FSH 2483, and 5210 will be followed.

(3) Program

(a) The main objective of the Annual Timber Harvest and Access Road Plan will be the development of a complete access road system which will permit orderly removal of high-risk stands.

(b) All timber sale contracts will provide clauses for removal of high-risk and infested trees.

(c) Slash disposal and stand improvement work will be accomplished in a manner that will hold insect problems at a minimum.

(d) Forest personnel will be trained to recognize insect population buildups and report findings currently.

(e) Planned sales program will be modified as necessary to achieve control of insects or salvage infested timber.

f. Rodent Control

(1) Problem - Porcupine damage to ponderosa pine and lodgepole pine is prevalent throughout the working circle. These rodents have caused severe damage on the east side of the Bitterroot and the lower west side of the Darby block.

Damage to young ponderosa pine stands in the Lick Creek and Rye Creek drainages reached such serious proportions in 1958 that direct control measures became necessary. Two control projects (direct hunting) have been completed to date--one in 1959 that covered 4,500 acres of the Rye and Lick Creek drainages, and the other in 1961 which included previously treated areas plus approximately 4,000 acres of the lower west side of the Darby block. Both projects were successful in reducing rodent damage to a tolerable level.

Damage from other rodents has been insignificant. As management intensifies, control of the smaller rodents may be needed.

(2) Policy - Areas indicating severe rodent damage will be promptly reported and action will be taken to control by effective, acceptable methods. (Reference FSH 2483.2)

(3) Program - Areas of severe rodent damage will be surveyed to determine extent of damages and cost of control. The cooperation of the Fish and Wildlife Service will be obtained in implementing plans for the control project. Killing of porcupines by forest personnel and forest users will continue to be encouraged.

g. Fire Control

(1) Annual Losses - The average annual burned area during the period 1943-1960 was approximately 315 acres. Analysis of statistics shows an increase in average number of fires during the past eight years (1953-1960) with a corresponding increase in acreage burned. The increase in burned areas is largely attributable to the catastrophic fire situation experienced during 1960, with a single fire burning 3,000 acres of a total of 5,665 acres. However, even without considering 1960, there has been a definite upward trend during the last 8 years.

It is reasonable to expect that fire occurrence will remain close to 100 starts annually. With the improvement in fire suppression techniques, the annual burned area should not exceed average losses for the past eighteen years which is about one-twentieth of one percent of the commercial forest area.

The major reason for the recent increase has been the abnormal weather pattern. Extended dry periods, with accompanying heavy lightning, have prevailed throughout the last eight years. Man-caused fires have increased along with lightning fires, but they account for only a small portion of the acreage burned. With improvement in accessibility,

better equipment, and fire fighting techniques, it is logical to expect a lesser acreage burned. That hasn't been the case and past weather records indicate present weather conditions will continue for at least several more years.

The forested areas of the working circle become highly inflammable during the summer from dense resinous litter on the forest floor. This, coupled with heavy lightning storms during July and August, provides conditions for easy starting and fast spread of fires.

Another factor that accounts for the high fire hazard is the mountain pine beetle epidemic that killed off most of the mature lodgepole pine during 1928-1932. This material has now decayed to the point where it provides a ready made fire situation which becomes critical during severe weather periods. For number of fires and acreage burned, see appendix table 29.

(2) Policy and Objectives - The objective in fire control is to meet regional fire control standards for prevention, presuppression, and suppression set forth in FSM 5101. This includes meeting and staying within burned area and other "par" limitation. The burned area limit for the working circle is 125 acres annually.

(3) Program - A fire control plan will be prepared for all active timber sales on the forest. This plan will be prepared in cooperation with the operators, and responsibilities for both parties will be clearly defined in the fire control job. Slash disposal and fire control plans will be closely coordinated and all state laws relative to each will be adhered to.

Prevention guards will be employed during the fire season to require observance of fire laws and inform the public of fire danger.

Detection is provided by a system of lookouts supplemented by use of aerial patrol planes. The intensity of manning lookouts and frequency of aerial patrols will be governed by fire weather conditions.

Aerial delivery of fire retardants and use of smokejumpers in remote areas will be used at every opportunity. A system of heliports is now incorporated into the fire control plan which will speed up transporting manpower and equipment.

Hazard created by logging slash will be currently reduced to acceptable levels on cutting areas or protection will be provided until hazards are reduced.

(4) Slash Disposal - The objective in slash disposal will be to reduce the fire hazard to a medium-medium fuel type. Method of disposal will depend upon the slash concentration, terrain, rapidity of natural abatement and desired results. Method of treatment will include machine piling and burning, lopping and scattering, hand piling and burning, prescribed burning, or protection in lieu of

complete disposal. Where snags or fire-dangerous trees significantly add to the fire hazard, timber sale contracts will provide for felling.

Slash disposal plans will be prepared for each large sale, outlining methods and extent of disposal required. Progress maps will be kept current on accomplishments and depict methods used. These maps will be filed in compartment folders for future reference on effect of disposal and stand regeneration.

(5) Silvicultural Tool - Prescribed burning has had only limited use in the working circle to date. Greater use of fire will be made to stimulate regeneration, prepare favorable seedbeds and dispose of slash on steeper slopes that prohibit use of mechanical measures. It is the most economical method of eliminating defective and undesirable stands and will help to control pathological conditions.

#### h. Acquisition and Exchange

The long-term objective is to continue toward consolidation of national-forest lands. A detailed land exchange plan is presently in the making. Opportunities for exchanges exist which would be to the advantage of both public and private owners. Consolidation by purchase is not anticipated.

The road right-of-way acquisition needs have been mentioned in relation to the "Proposed Cut and Sell" and "Timber Access Road" plans (Forest Development, Transportation Program). Actually, the road right-of-way shown in the five-year timber harvest plan is only a part of the rights-of-way that will need to be acquired to complete the planned road system. In the next four years, 1962 to 1965, it is estimated that approximately 40 miles of all-purpose road rights-of-way will need to be acquired in addition to the 85 miles of timber access road right-of-way shown in the above plan.

The securing of these rights-of-way across private land presents a difficult problem within the working circle. To avoid complications and undue delay in the timber sales program, every effort will need to be made in securing rights-of-way shown in Right-of-Way Acquisition Plan (appendix table 30).

### 9. COOPERATION

During the early part of 1952, all the State and Federal Conservation agencies in Ravalli County teamed together and formed the Ravalli County Agriculture Resource Association to determine how to promote action for maximum conservation results within the county. A report has been written and a program outlined thereon. Recognition will continue to be given to the program in an effort to meet conservation needs and objectives.

#### a. With Other Federal Agencies

Continue cooperation with The Soil Conservation Service, Production and Marketing Administration, Farmers Home Administration, and any other agency which has activities or may influence uses within the working circle.

b. With State Agencies

The State of Montana Forestry Department and the Bitterroot National Forest have a memorandum of understanding on responsibilities regarding their respective fire protection zones. There is mutual understanding on timber sale policies. Wherever there are stands of timber with intermixed State and Federal ownership, it is hoped that both agencies can work out agreements concerning such factors as road construction and sales of mature timber to both parties' mutual advantage and to the advantage of the purchaser of the timber. Full cooperation and friendly relations are maintained with the State Game Department through the Ravalli County Game Warden and the Big Game Biologist stationed in Hamilton and Missoula. We will continue to work closely with this department in its efforts to keep big-game herds in balance with food supplies. Special emphasis will be placed on mutual planning for road locations in regard to fisheries and other recreation values. Other State agencies will be advised and consulted on matters of material concern.

c. With Private Forest Land Owners

Adjacent to and bordering on all sides of the farmland in the valley bottom there are 103,200 acres of forest land in small ownership and 20,801 acres in large ownership that formerly supported an excellent stand of ponderosa pine. This forest land is now in various conditions of management. Practically all of it has been cut over. On some areas attempts have been made to convert to cultivated farmland without success. Other areas have been used for grazing and most of it supports ponderosa pine and other timber growth in various degrees of stocking in age classes from seedlings to large poles.

In general, these privately-owned ponderosa pine lands are of higher site quality than those in the national forest. This potential production could sustain a major portion of the local timber economy. They are also suitable for winter logging. One of the principal dangers is that the second growth pine will be logged prematurely, in fact, it is already occurring to some extent. Every practical effort will be made to encourage good forest management on these private lands.

The problem contained in the above acreage is of such magnitude that special and immediate consideration is necessary. These lands, at the present time, are producing an excellent crop of ponderosa pine saplings and poles. Should, for example, a pulp plant be placed in the lower Clark Fork drainage, these young stands would be 90 percent liquidated. The time thus far gained would be lost and the general resultant land abuse evils which followed the removal of the original timber stand on these acres would again confront the Bitterroot Valley.

From the Timber Resource Review comes the information that the small tracts in private ownership must continue to supply a substantial portion of the raw material for the forestry industry. Where this nation stands in timber supply at the end of the century depends largely

on actions taken during the next two decades. Rapid acceleration of recent encouraging forestry trends is vital if timber resources of the nation are to be reasonably abundant fifty years hence. Because of the magnitude of potential demand and the difficulty of extending more intensive forestry to millions of small holdings, time is important. The potential of these private holdings is adequate. Locally the following will be accomplished to assist in the proper management of these private holdings:

- (1) Work with State Equalization Board and County Commissioners to secure land reclassification for an equitable tax base for this type of land.
- (2) Provide adequate fire protection.
- (3) Deferring cutting, except thinnings, on immature timberlands until culmination of growth.
- (4) Discourage clearing of timberland for cultivation or pasture except in instances where soil studies indicate it would be more productive if cleared. Discourage clear cutting for pulpwood purposes. The recently completed soil survey of the Bitterroot Valley would be helpful in this regard.
- (5) Encourage application of proper cutting practices.
- (6) Encourage improvements of young stands through release cuttings and thinnings for pulpwood, Christmas trees, etc., which will provide an interim income and act as an incentive to hold timber until maturity.
- (7) Make studies of the feasibility of severance taxes on timberlands as a means of encouraging the holding of the timber crop until maturity.
- (8) Encourage conserving the soil resource by good practices, such as locating roads on grades that will not erode, using erosion prevention measures on skid trails, keeping damage to young growth as low as possible, and disposing of slash in hazardous areas.
- (9) On areas where soil and slope are suitable, encourage establishment of grass cover under the timber to increase the volume of feed and further minimize soil losses by revegetation, fencing, proper use, or a combination of these methods.
- (10) Promote the creation of a State law patterned after the Forest Practices Act of the State of Washington, limiting the minimum cutting requirements.

d. With Private Organizations

- (1) Cooperate with local sportsmen organizations and keep them informed of our programs and activities. Work with Ravalli County Fish and Wildlife Club and the Department of Fish and Game in an effort to hold big game herds in balance with range.
- (2) Cooperate with recreational organizations by coordinating timber and recreation program.
- (3) Cooperate with local chamber of commerce and interested local citizens on access road programs and in creating and sustaining local industry.
- (4) Acquaint local civic clubs and key individuals in the community with Forest Service timber management plans, practices, and policies.

e. With County

Cooperation with county will be continued in correlating Forest Service timber access road construction plans with county road plans so that resulting road system will serve both Forest Service and county needs insofar as possible.



## E. SUPPORTING DATA

### 1. HISTORY

Ravalli County is one of the most compact counties in Montana. The agricultural area in the valley bottom and the adjacent benchlands are surrounded by a zone of semiarid foothill land originally covered with sagebrush, grass and scattered patches of timber. The third and outer zone is a rough horseshoe-shaped rim of mountains covered with timber in private, state, and Federal ownership.

When Lewis and Clark, on their Pacific expedition passed through the Bitterroot Valley in the summer of 1805, they found the Flathead Indians in possession of the land. Later this same tribe of Indians, having heard from nomadic Iroquois Indians and Canadian traders of the Catholic missionary work, sent a delegation to St. Louis with a request that the "Black Gowns", as the Catholic priests were called, be sent out to their tribe. In answer to this call, Father DeSmet and five associates came to the Bitterroot Valley in the spring of 1841 and established St. Mary's Mission and constructed the first church in Montana near what is now Stevensville. The following year, in 1842, grain and potatoes were planted near the mission and this is believed to be the first attempt at agriculture in Montana. Cattle were brought to the valley from Fort Colville on the Columbia River the same year.

In 1845 Anthony Ravalli, an Italian Jesuit, came to labor among the Indians. He built for the Indians Montana's first grist mill, teaching them to make bread from their wheat.

In 1850 Major John Owen came to the valley, and after several difficult years, succeeded in making himself a trader of note. Following him came the first white settlers who came to make their homes here.

The building of the main line of the Northern Pacific Railway gave an impetus to the agriculture as well as the logging industry of this region. The logging and construction camps created a good local market for foodstuffs. When the railroad was completed in the summer of 1883, a flourishing settlement was already established in the Bitterroot Valley. Livestock, hay, and grain were the main agriculture enterprises, although orcharding had been tried on a small scale even at this time.

The first record of a sawmill being established of any consequence in Ravalli County was at the present site called Riverside. The date of establishment was in 1879. In 1885 the Kendall Brothers constructed a sawmill on the west side at the mouth of Sawtooth Creek. In 1890 Marcus Daly, founder of the Anaconda Copper Mining Company, bought out the Kendall Brothers and constructed a large, fully equipped mill on the east side of the river beyond the west end of what is known as Main Street of Hamilton. The town of Hamilton was originated at the same time, developing as a community for sawmill workers. In 1915 the mill was closed down and moved to Bonner, Montana, where the Anaconda Company still operates a mill.

Ravalli County was organized in 1893 from a part of what was then Missoula County. The precincts from which the County was later organized had a population of 2,613 according to the 1890 census; in 1900 the population had increased to 7,882, and in 1910 to 11,666. In 1920 the population had decreased to 10,098. The 1950 census figures show a population of 13,101. The present 1960 census for Ravalli County shows population at 12,341 which is a decrease of 5.8 percent from 1950.

Although the decline of population of the county between 1910 and 1920 had been somewhat affected by the growth and decline of the lumber industry, in order to understand fully the reasons for the decrease, it is necessary to know something about the land development projects that had been undertaken in the valley. As early as 1870 an apple orchard was started and was apparently successful. In 1900, over 300,000 bearing trees were reported for Ravalli County. Most of the early plantings of orchards were on the west side of the valley where water for the benchland was available from the mountain streams without much outlay for irrigation construction. In 1905 an eastern syndicate, incorporated under the name of Dinsmore Irrigation and Development Company, proposed to build a ditch from Lake Como to carry water across the river to irrigate the east benches for apple orchards. In 1908, after a series of financial difficulties, the company went bankrupt. A reorganization was effected and the company was incorporated under the name of The Bitterroot Valley Irrigation Company.

The land was subdivided into five- and ten-acre tracts to be sold as orchard tracts. An intensive and elaborate campaign was carried on.

In 1916 The Bitterroot Valley Irrigation Company went into bankruptcy. Much of the land that was still held by the company reverted to the county in payment of delinquent taxes. A large amount of land that was sold by the company was likewise taken over. This was the end of boom development for the valley.

With the sawmill leaving the valley at approximately the same time as the bursting of the bubble of apple orchard prosperity, the combination was a severe shock to the residents of the county and accounts for the decrease in population between 1910 and 1920.

The Bitterroot National Forest was first established by Presidential proclamation on February 22, 1897. The original forest boundaries include all the area west to the Salmon River. On July 1, 1908, the Nezperce Forest was formed from the west portion of the Bitterroot Forest. The present gross area of the Bitterroot National Forest is 1,650,253 acres.

## 2. PHYSIOGRAPHY

### a. Topography

The working circle is entirely within the Bitterroot River drainage. The river flows through the middle of the working circle branching into two forks at Conner south of Darby, the East Fork and the West Fork. The topography within the ponderosa pine type varies from gently rolling hills to long steep slopes. The upper slopes generally are steep and are occupied by Douglas-fir and lodgepole pine types. Ridge tops are sharp for the most part.

The elevation above sea level ranges from an average of 3,500 feet in the valley bottom to 10,000 feet. A majority of the commercial timber type is between 4,000 to 7,500 feet.

### b. Soils

The forest soil consists of decomposed granite for the most part, ranging from less than a foot in depth on exposed slopes and ridges to several feet in protected areas. It averages between two and three feet. The soil mantle, when not disturbed, drains rapidly and well. When the soil mantle is disturbed through such operations as road construction or skidding of logs, the soil erodes readily. Consistent care must be exercised to put logging roads on good grade locations (generally six percent or less), provide drainage and control use to prevent the loss of soil by erosion. The soil erosion control problem becomes larger in scope as logging progresses into the steeper areas and at higher elevations.

Moderately extensive areas of soils developed over "hard rock"--argillite, quartzite, and limestone--extend from Skalkaho Creek north on the national forest on the east side. Extensive areas of glacial till occur near the divide on the south and east sides. Soils on these areas are comparatively less erosive than those of granitic areas, due partly to depth, soil texture, and amount of coarse fragments, on comparable cover types and slope conditions.

### c. Climate

The average annual precipitation for Hamilton is eleven inches and the mean annual temperature 47 degrees. The average precipitation varies from 15 inches on lower mountain slopes to 55 inches at the higher elevations with an average of 25 inches in the timbered portion of the working circle. Most of this moisture comes in the form of snow during late fall and winter months.

The climate in the valley bottom is moderate. The high mountains on both sides of the valley protect the lower elevations from excessive winds and snowfall. Prevailing winds are from the southwest. Generally, rainfall occurs in June with July, August, and September being the driest period of the year. Logging season is approximately eight to ten months, varying by elevations.

High precipitation is normally expected in the Magruder Ranger District--40 to 50 inches average annual precipitation. The high elevations on the south and east probably exceed 25 inches to a figure near 30 to 40 inches average annual precipitation.

### 3. ECONOMY

#### a. Population and General Economy

The total population of the working circle is estimated to be approximately 12,600 people as of the year 1960, including estimated 259 people in the Missoula County portion of the working circle. The distribution of population by communities or districts is as follows:

Florence Carlton	600
Stevensville	2,500
Victor	700
Corvallis	1,200
Hamilton - Grantsdale	6,000
Charles Heights	100
Darby	1,200
Conner	200
Sula	<u>100</u>
Total	12,600

The 1960 census figures show a population of 12,341 people in Ravalli County and amounts to a decrease in population of 5.8 percent since 1950.

The assessed valuation of property of all kinds in Ravalli County was \$25,496,922 as of the year ending December 31, 1960. Total county taxes were \$1,083,593.52 for the same year. Of the total taxes \$171,137.22 was paid by the public utilities.

Total deposits for the four Ravalli County banks as of December 31, 1960, were \$11,874,818.94. Based on a population of 12,341 at the same time, the per capita deposits were \$962.23. The average annual income per family unit for the last few years has been approximately \$2,500.00, which puts Ravalli County in the lowest five counties in Montana.

The rating of importance based on income of the principal industries within the working circle is as follows:

(1) Agriculture

(2) Nonagriculture

- (a) Federal, State and local governments
- (b) Wholesale and retail trade
- (c) Forest products and manufacturing
- (d) Contract construction

The number of employable nonagricultural force within Ravalli County according to the local employment office is 2,500. The number of business firms within the county is approximately 200.

The receipts for all resources from the Bitterroot Working Circle have averaged, for the past few years, around \$265,000 per year. Sale of timber is responsible for ninety-six percent of the receipts; grazing use, three percent; and other forms of land use, one percent.

b. Industries

Forest Products - Presently there are thirty sawmills operating within the working circle. The average annual cut by individual mills ranges from 50 M board feet to 12 MM board feet. Daily sawing capacity varies from as low as 5 M board feet to as high as 50 M board feet for one eight-hour shift. Out of the 30 mills, 75 percent cut less than 1 MM board feet annually. There are only 7 mills cutting over 1 MM board feet annually. Four of these are located in Darby and the other three north of Hamilton. The balance of the mills is small in size and capacity, ranging in annual cut from practically nothing to 800 M board feet.

Most of the smaller mills are located in the lower end of the valley from Hamilton north to Stevensville and vicinity. Most of these smaller operations were developed during the war years and thrived mainly on private timber. The private timber has been depleted to the point that there is no longer sufficient timber to keep all the mills supplied.

Of the total estimated annual cut on all ownerships of 40 MM board feet, 55 percent is air dried and planed within the working circle. The balance is shipped rough green out of the valley to be dried, planed, and remanufactured. Four of the seven larger mills have band headsaws. All the other mills have circular headsaws.

The annual payroll from the logging and lumbering industry in the valley amounts to approximately \$750,000. The number of men employed is 300, with 220 men employed the year round and the balance of 80 men employed on a seasonal basis. It is estimated that 1,400 people, or 11 percent of the population, is directly dependent upon the lumbering and logging industry within the working circle.

A conservative estimate of the capital investment in the logging and lumbering industry is \$1,500,000. The gross income from the sale of forest products is approximately \$2,500,000.

It is estimated the number of men employed by the manufacture of lumber in the valley could be increased three times over its present number by higher utilization of the logs hauled to the local mills.

The increase cited above is based only on the increased efficiency on the present volume of timber cut. When the lodgepole pine and the pure Douglas-fir stands of timber become more in demand and accessible, the number of people supported by the lumbering industry can be further multiplied. Not only will the number of people employed directly by the lumbering industry be increased, but also those indirectly dependent on the forest products industries for their livelihood such as the trade and service groups, professional people, etc.

Very closely related to the logging and lumber industry is the Christmas tree industry that centers around Darby. It is estimated that 30,000 trees were shipped from public and private lands in 1960. Principal points of export were to the southwestern states, including California and the midwest states. This is a marked decrease in past years due to heavy spruce budworm infestation on both national-forest and private lands.

Agriculture - The Bitterroot Valley is primarily a farming community. Upwards of fifty percent of the population of Ravalli County depends directly on farming in one form or another for their livelihood. A 1960 census places the number of farms in the county at 1,178 with total farm population of about 6,000 people.

The gross income from agricultural products in 1959 was \$8,011,600. The net cash farm income for 1959 was approximately \$1,600,000.

The major type of farming is cattle raising for beef and dairy products. Seventy-five percent of the farmland used for agriculture is in pasture, and the other twenty-five percent is in cultivated crops. Some of the principal cultivated crops are sugar beets, potatoes, pea seeds, strawberries, raspberries, corn, wheat, and oats.

Down through the center of the Bitterroot Valley there is a narrow fertile strip of farmland. The area of this strip of land has been estimated at 127,000 acres which is largely irrigated. The strip of fertile land is surrounded by a zone of semiarid foothill benchland originally covered with sagebrush, grass, and scattered patches of timber. It is here where dry farming was overextended during World War I.

In the early days of farming in the Bitterroot Valley, the farms were subdivided into many small holdings that proved inadequate for a family home unit. The average size of present day farms approaches 200 acres, but there are still quite a number that are classed as "stump" ranches and are uneconomical. Soils have been farmed that were not suited for farming. The soils were thin to start with and through irrigation and cultivation this thin layer of top soil was eroded away. Benchlands were overgrazed, and a large acreage of sloping sagebrush and grassland unsuited for cultivation was plowed and dry farmed. Irrigation of the land was not planned, resulting in wastage of much water. No provision was made for drainage of excess water which resulted in water-logged land in some places.

Mining - In 1952 a fluorite mine was developed southeast of Darby. A California firm under the name of Cummings & Roberts is operating the mine and distributing the flux material to the Bethlehem Steel. In 1952, 18 M tons of the mineral were mined and shipped, and in 1953, 6 M tons. The operating company expects to continue operations indefinitely. Production through 1960 and 1961 averaged 20 M tons.

There are numerous mining claims, both patented and unpatented, which have not as yet reached the paying stage of development.

Recreation - With a through modern highway bisecting the valley connecting Missoula with southern Idaho, there is considerable tourist travel within the working circle. The fishing streams, big game, high rugged mountains, hot water springs, the wilderness areas, and picnic grounds provide the recreationists or tourists with ample opportunity to stop and enjoy themselves.

New Industries - One of the best opportunities for a new industry for the working circle is in the field of wood fibre manufacturing plants. Mill residue from only three of the established mills is of sufficient quantity to sustain a wood-particle board manufacturing plant.

Another important way in which the value of forest products to the economy of the valley would be increased is through the development of farm woodlots. Owners of these woodlots would be encouraged and advice given on how to practice good forestry.

The potential of practicing good forestry on private and state lands is high. Some of the best growing sites are located at the lower elevations and are mainly in private ownership. Seventy-six percent of the private and state land is suitable for ponderosa pine.

#### 4. WORKING THE PLAN

##### a. Annual Plans

(1) The management plan is to be used as a tool. Annual plans will have to be made relative to the cutting budget and access roads. Access road planning will tie in with the cutting budget and keep five years ahead of the actual timber cutting and road building.

(2) Planting and planting survey plans should be started immediately and information or data necessary to complete the plan be collected currently. Each year a list of plantation priorities should be established and followed.

(3) Stand improvement and sale area betterment plans will be made each year. The plan will include specifications on how best to treat each individual sale area for the most productive results.

##### b. Control Records

(1) Cumulative volume and area control records will be posted after each fiscal year. These records will indicate in what respect cutting must be emphasized in ensuing years to make up for deficiencies of volume or area cut previously. The location of sales should be shown on the overlays and keyed to the cutover record sheets. The rangers should keep similar records for their district sales. (See FSH 2444.5)

(2) Planting records will consist of maps showing location of plantations and a data sheet giving dates of establishment, species and age class planted, and the survival record.

All records and maps will be posted annually from the previous year's accomplishments. Promise cards will be set up as a reminder.

##### c. Maps

The following prepared forest management maps are on file in the Forest Supervisor's office:

1. Map showing the location of the compartments in the working circle.
2. Ownership map.
3. Timber type map.
4. Transportation plan map.

APPENDIX

BITTERROOT WORKING CIRCLE

TIMBER MANAGEMENT PLAN



## INVENTORY TECHNIQUE AND ACCURACY

Data for the inventory of this plan are based on instructions issued by Region One in 1955 and 1956 and "Field Instructions for Forest Inventory" prepared by the Intermountain Forest and Range Experiment Station. In brief, the following techniques were:

1. Photointerpretation (1958-1960)
2. Field checking (Done 1959-1960)
3. Transfer to planimetric map (1959-1960)
4. Area calculation (1960-1961)
5. Sampling (1958-1960)
6. Compilation of data and testing the statistical accuracy.

## RELIABILITY OF DATA

Two sources of error are involved in determining the volume and acreage of various strata:

1. Technique errors in measuring, recording, and compiling sample plot acreage and volume data. These errors are minimized by refinement of measurements, adequate training and checking of individuals responsible for the field and office work.
2. Sampling errors which are measurements of the reliability of estimates taken from populations.

The objective was to limit the sampling error for the working circle to within + ten percent, two times out of three. This objective has been met on this working circle. The total sampling error for 1,003,543 M cubic feet of volume on national forest is expected to be within + 60,210 M cubic feet of actual volume, two times out of three.

Highlights of the coefficient of variation and the sampling error based on cubic foot volume of trees 5.0" and larger for the various strata of the Bitterroot Working Circle:

Strata	Coefficient of Variation - Percent	(1 SD) Sampling Error Percent
P9M	33	17
P9P	61	17
Total Ponderosa Pine		11
<hr/>		
D9M	46	15
D9P	50	18
Total Douglas-fir		10
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S9M	38	17
S9P	28	16
Total Spruce		11
<hr/>		
LP8W	71	36
LP8M	73	28
LP8P	47	16
Total Lodgepole Pine		17
<hr/>		
TOTAL ALL		6

TOTAL LAND AREA BY OWNERSHIP

Appendix Table 1

Bitterroot Working Circle

Block and Working Circle	Total Land Area Acres	National Forest		State Acres	Other Public	Forest Industry	Other Private
		Total	Nonreserved				
Stevensville	128,329	107,253	107,253	-	1,054	120	6,406
Darby	219,972	194,434	194,434	-	2,909	-	11,708
Sula	247,931	220,297	177,029	43,268	13,798	-	365
West Fork	297,117	295,960	295,960	-	48	-	-
Magruder & East Slope of Bitterroot Mountains 1/	756,904	756,682	-	756,682	-	-	-
<b>TOTAL</b> <b>Bitterroot Working Circle</b>	<b>1,650,253</b>	<b>1,574,626</b>	<b>774,676</b>	<b>799,950</b>	<b>17,809</b>	<b>120</b>	<b>18,479</b>
							<b>39,219</b>

1/ All in primitive status. Acreage not considered in plan or carried beyond appendix table 1.

TOTAL LAND AREA BY MAJOR LAND CLASSES

Appendix Table 2

Bitterroot Working Circle

Block and Working Circle	Total	Non-forest Land	Forest Land				
			Total	Non-commercial	Commercial		
acres							
<u>Stevensville Block</u>	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
Nat'l Forest Nonres.	107,253	3,390	103,863	10,834	93,029	90,608	2,421
Nat'l Forest Res.	-	-	-	-	-	-	-
State	1,054	51	1,003	-	1,003	1,003	-
Other Public	120	-	120	-	120	120	-
Forest Industry	6,406	25	6,381	305	6,076	6,011	65
Other Private	13,496	340	13,156	3	13,153	11,767	1,386
Total	128,329	3,806	124,523	11,142	113,382	109,509	3,872
<u>Darby Block</u>	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
Nat'l Forest Nonres.	194,434	7,580	186,854	6,739	180,115	179,545	570
Nat'l Forest Res.	-	-	-	-	-	-	-
State	2,909	58	2,851	50	2,801	2,260	141
Other Public	-	-	-	-	-	-	-
Forest Industry	11,708	98	11,610	-	11,610	11,592	18
Other Private	10,921	801	10,120	-	10,120	9,858	262
Total	219,972	8,537	211,435	6,789	204,646	203,655	991
<u>Sula Block</u>	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
Nat'l Forest Nonres.	177,029	10,441	166,588	2,214	164,374	159,982	4,392
Nat'l Forest Res.	43,268	2,260	41,008	5,935	35,073	34,326	747
State	13,798	1,254	12,544	-	12,544	12,536	8
Other Public	-	-	-	-	-	-	-
Forest Industry	365	-	365	-	365	365	-
Other Private	13,471	9,254	4,217	38	4,179	4,076	103
Total	247,931	23,209	224,722	8,187	216,535	211,285	5,250
<u>West Fork Block</u>	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
Nat'l Forest Nonres.	295,960	9,536	286,424	14,629	271,795	266,736	5,059
Nat'l Forest Res.	-	-	-	-	-	-	-
State	48	-	48	-	48	48	-
Other Public	-	-	-	-	-	-	-
Forest Industry	-	-	-	-	-	-	-
Other Private	1,109	298	811	-	811	796	15
Total	297,117	9,834	287,283	14,629	272,654	267,580	5,074

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Appendix Table 2 (continued)

Block and Working Circle	Total	Non-forest Land	Forest Land				
			Total	Non-commercial	Total	Stocked	Commercial
----- acres -----							
<u>Bitterroot W.C.</u>							
Nat'l Forest Nonres.	774676	30947	743729	34416	709313	696871	12442
Nat'l Forest Res. 1/	799950	89684	710266	301273	408993	394331	14662
State	17809	1363	16446	50	16396	16247	149
Other Public	120	-	120	-	120	120	-
Forest Industry	18479	123	18356	305	18051	17968	83
Other Private	39219	10773	28446	125	28321	26555	1766
TOTAL	1650253	132890	1517363	336169	1181194	1152092	29102

1/ Selway Bitterroot reserved area data not apportioned by blocks.

COMMERCIAL FOREST LAND BY TYPE, STAND-SIZE CLASS, AND STOCKING  
(Nonreserved National Forest Land)

Appendix Table 3

Bitterroot Working Circle

Block and Working Circle	Forest Type	Total Area	Sawtimber Stocking			Poletimber Stocking			Seedling and Sapling Stocking			Non-stocked	
			Total	Well	Med.	Poor	Total	Well	Med.	Poor	Total	Well	
												Acres	
<u>Stevensville Block</u>	D	22832	20365	409	9626	3567	10330	1934	815	957	162	478	226
	P	17793	14093	585	-	-	9941	3107	1065	786	1256	262	262
	LP	35231	-	-	218	417	-	21907	8885	9535	3487	9294	-
	WLP	2599	635	-	276	674	1964	-	-	1659	305	-	-
	AF	1831	964	14	4004	2413	867	8	817	42	-	-	-
	S	8885	6680	263	1224	1761	41	14	27	-	1569	1062	343
	L	3858	3047	62	-	565	490	490	75	-	246	164	595
<b>TOTAL</b>		<b>93029</b>	<b>45784</b>	<b>1333</b>	<b>18915</b>	<b>25536</b>	<b>30385</b>	<b>11277</b>	<b>13856</b>	<b>5252</b>	<b>14439</b>	<b>10802</b>	<b>2505</b>
<u>Darby Block</u>	D	44657	39273	1132	11981	-	26150	4687	3451	558	678	675	-
	P	51553	42640	1068	-	12547	29025	8297	2983	1519	3795	341	48
	LP	60214	47	-	-	47	48901	10273	20746	17882	11256	9068	5
	WLP	3542	1645	-	432	1213	1789	66	771	952	108	-	-
	AF	6873	2926	-	277	2649	3922	51	2630	1241	-	-	-
	S	13224	13136	138	8895	4103	30	30	-	-	-	-	-
	L	52	52	-	22	30	-	-	-	-	-	-	-
<b>TOTAL</b>		<b>180115</b>	<b>99709</b>	<b>2338</b>	<b>34154</b>	<b>63217</b>	<b>67626</b>	<b>16854</b>	<b>26224</b>	<b>24548</b>	<b>12210</b>	<b>9414</b>	<b>893</b>
<u>Sula Block</u>	D	60073	51740	656	19197	31887	-	-	-	-	-	-	-
	P	24563	22965	84	4528	18353	759	5746	3490	828	1428	579	467
	LP	61053	212	-	190	22	48270	14095	16150	18025	10733	7070	33
	WLP	2731	2550	-	-	2550	70	-	70	-	-	2083	1580
	AF	4072	1504	-	338	1166	1495	134	1009	352	772	74	59
	S	11882	11078	17	6416	4645	206	-	84	122	-	-	-
<b>TOTAL</b>		<b>164374</b>	<b>90049</b>	<b>757</b>	<b>30669</b>	<b>58623</b>	<b>56546</b>	<b>17786</b>	<b>18358</b>	<b>20402</b>	<b>13387</b>	<b>7756</b>	<b>2768</b>

(Continued on next page)

Appendix Table 3 (continued)

Block and Working Circle	Forest Type	Sawtimber Stocking			Poletimber Stocking			Seedling and Sapling Stocking			Non-stocked	
		Total Area	Total Well	Med.	Total Poor	Total Well	Med.	Poor	Total Well	Med.	Poor	
		Acres										
West Fork Block	D	80629	66552	952	21447	44153	12259	4701	3686	3872	1471	622
	P	41562	40063	506	13838	25719	943	237	318	388	192	46
	LP	126546	408	-	23	385	72710	33065	23279	16366	49211	33828
	WLP	580	454	-	125	329	110	-	3	107	-	-
	AF	8461	4638	71	1150	3417	3355	652	1550	1153	419	-
	S	13769	12698	1208	7329	4161	868	441	334	93	137	12
	L	248	-	-	-	-	-	-	-	248	-	35
TOTAL		271795	124813	2737	43912	78164	90245	39096	29170	21979	51678	34576
Bitterroot Working Circle	D	208191	177920	3149	62251	112520	24626	12457	6029	6140	3994	1742
	P	135471	119761	2243	34480	83038	13106	4352	2910	5844	1137	152
	LP	283044	667	-	213	454	191788	66318	69710	55760	83084	59260
	WLP	9452	5284	-	775	4509	3933	66	2433	1434	108	-
	AF	21237	10032	85	2041	7906	9639	845	6006	2788	1191	74
	S	47760	43592	1626	26644	15322	1145	485	445	215	1706	1074
	L	4158	3099	62	1246	1791	565	490	75	-	494	246
TOTAL		709313	360355	7165	127650	225540	244802	85013	87608	72181	91714	62548
												14991
												14175
												12442

NET VOLUME (BOARD FEET) SAWTIMER-SIZE TREES BY SPECIES AND OWNER  
 (In Pole and Sawtimber Stands - Standard Nonreserved Commercial Forest)

Appendix Table 4

Bitterroot Working Circle

Block and Working Circle	Owner	Stocked Com'1. (acres)	Total Volume (MBF)	Volume by Species - MBF			
				L-D	S	H-AF-GF	LIP-MLP
<u>Stevensville Block</u>	National Forest State	76,169 1,003	484,030 6,732	- 100,402 2,832	229,790 3,225	83,982 260	38,545 177
	Other Public Forest Industry	120 5,422	456 35,200	- 4,797	- 21,591	- 4,162	- 2,643
	Other Private	11,324 94,038	50,520 576,938	- 123,526	28,178 283,096	2,800 91,204	1,417 42,782
	Total	-	-	-	-	-	-
							36,330
<u>Darby Block</u>	National Forest State	167,335 2,593	971,905 13,454	- 279,717 4,534	387,466 7,588	153,277 271	77,712 234
	Other Public Forest Industry	11,376 9,792	65,934 52,829	- 10,901 23,621	40,547 24,471	4,699 1,270	4,317 985
	Other Private	191,096	1,104,122	- 318,773	460,072	159,517	83,248
	Total	-	-	-	-	-	82,512
<u>Sula Block</u>	National Forest State	146,595 11,527	818,415 73,720	- 156,904 35,827	404,328 31,324	121,287 2,238	66,679 1,828
	Other Public Forest Industry	1,120 2,458	1,265 16,239	- 7,747	60 6,499	410 764	294 595
	Other Private	161,700	909,639	- 200,538	442,561	124,534	69,396
	Total	-	-	-	-	-	72,610
<u>West Fork Block</u>	National Forest State	215,058 48	1,185,331 361	- 278,672 172	549,040 165	184,643 5	85,704 5
	Other Public Forest Industry	-	-	-	-	-	-
	Other Private	663	3,910	- 558	1,180 550,385	1,248 185,896	527 86,236
	Total	215,769	1,189,602	- 279,402	-	-	397 87,683

(Continued on next page)

Appendix Table 4 (continued)

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MBF)	Volume by Species - MBF				
				WP	P	L-D	S	H-AF-GF LP-WLP
<u>Bitterroot Working Circle</u>	National Forest	605,157	3,459,681	-	815,695	1,570,624	543,189	268,640
	State	15,171	94,267	-	43,365	42,302	2,774	2,244
	Other Public	120	456	-	60	312	-	3,582
	Forest Industry	17,918	102,399	-	15,758	62,548	9,106	7,254
	Other Private	24,237	123,498	-	47,361	60,328	6,082	3,524
<b>TOTAL</b>		662,603	3,780,301	-	922,239	1,736,114	561,151	281,662
								<b>279,135</b>

**NET VOLUME (PARTIAL CUBIC FEET) SAWTIMBER-SIZE TREES BY SPECIES AND OWNER**  
**(In Pole and Sawtimber Stands - Stocked Nonreserved Commercial Forest)**

Appendix Table 5

Bitterroot Working Circle

Block and Working Circle	Owner	Stocked Commercial acres	Total Volume (MCF)	Volume by Species (MCF)					
				WP	P	L-D	S	H-AF-GF	
<u>Stevensville Block</u>	National Forest	76,169	98,544	-	19,689	46,900	16,796	8,201	6,958
	State	1,003	1,356	-	555	658	52	38	53
	Other Public	120	95	-	12	64	-	-	19
	Forest Industry	5,422	7,188	-	941	4,407	832	562	446
	Other Private	11,324	10,237	-	3,027	5,751	560	301	598
<u>Darby Block</u>	Total		94,038	117,420	-	24,224	57,780	18,240	9,102
	National Forest	167,335	197,508	-	54,852	79,082	30,655	16,534	16,385
	State	2,593	2,726	-	889	1,549	54	50	184
	Other Public	-	-	-	-	-	-	-	-
	Forest Industry	11,376	13,487	-	2,138	8,276	940	918	1,215
<u>Sula Block</u>	Other Private	9,792	10,643	-	4,632	4,995	254	210	552
	Total	191,096	224,364	-	62,511	93,902	31,903	17,712	18,336
	National Forest	146,595	167,118	-	30,769	82,523	24,258	14,187	15,381
	State	11,527	14,812	-	7,026	6,393	448	389	556
	Other Public	-	-	-	-	-	-	-	-
<u>West Fork Block</u>	Forest Industry	1,120	265	-	12	84	49	63	57
	Other Private	2,458	3,266	-	1,519	1,326	153	127	141
	Total	161,700	185,461	-	39,326	90,326	24,908	14,766	16,135
	National Forest	215,058	241,263	-	54,647	112,059	36,929	18,235	19,393
	State	48	73	-	34	34	1	1	3
	Other Public	-	-	-	-	-	-	-	-
	Forest Industry	-	-	-	-	-	-	-	-
	Other Private	663	799	-	109	241	249	112	88
	Total	215,769	242,135	-	54,790	112,334	37,179	18,348	19,484

Appendix Table 5 (continued)

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MCF)	Volume by Species (MCF)				
				WP	P	L-D	S	H-AF-GF
<u>Bitterroot Working Circle</u>	National Forest	605,157	704,433	-	159,957	320,564	108,638	57,157
	State	15,171	18,967	-	8,504	8,634	555	478
	Other Public	120	95	-	12	64	-	796
	Forest Industry	17,918	20,940	-	3,091	12,767	1,821	1,543
	Other Private	24,237	24,945	-	9,287	12,313	1,216	1,718
TOTAL		662,603	769,380	-	180,851	354,342	112,230	59,928
								62,029

NET VOLUME (PARTIAL CUBIC FEET) POLETIMBER-SIZE TREES BY SPECIES AND OWNER  
 (In Pole and Sawtimber Stands - Stocked Nonreserved Commercial Forest)

Appendix Table 6

Bitterroot Working Circle

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MCF)	Volume by Species (MCF)					C
				MP	P	L-D	S	H-AF-GF-LP-WLP	
<u>Stevensville Block</u>	National Forest	76,169	37,695	-	1,730	7,352	2,776	8,974	16,863
	State	1,003	235	-	51	88	6	28	62
	Other Public	120	37	-	-	11	-	10	16
	Forest Industry	5,422	2,514	-	60	636	129	465	1,224
	Other Private	11,324	4,114	-	793	1,789	99	280	1,153
<u>Darby Block</u>	Total	94,038	44,595	-	2,634	9,876	3,010	9,757	19,318
	National Forest	167,335	78,788	-	4,542	14,833	4,050	17,836	37,527
	State	2,593	1,104	-	71	642	23	113	255
	Other Public	-	-	-	-	-	-	-	-
	Forest Industry	11,376	5,257	-	71	1,121	171	985	2,909
<u>Sula Block</u>	Other Private	9,792	2,758	-	633	1,138	27	270	690
	Total	191,096	87,907	-	5,317	17,734	4,271	19,204	41,381
	National Forest	146,595	72,403	-	1,174	14,255	4,120	15,658	37,196
	State	11,527	2,432	-	594	852	21	247	718
	Other Public	-	-	-	-	-	-	-	-
<u>West Fork Block</u>	Forest Industry	1,120	235	-	-	40	5	42	148
	Other Private	2,458	945	-	266	299	8	77	295
	Total	161,700	76,015	-	2,034	15,446	4,154	16,024	38,357
	National Forest	215,058	110,224	-	1,781	24,494	8,777	20,476	54,696
	State	48	9	-	1	4	-	1	3
	Other Public	-	-	-	-	-	-	-	-
	Forest Industry	-	-	-	-	-	-	-	-
	Other Private	663	341	-	-	-	-	-	-
	Total	215,769	110,574	-	1,786	24,551	8,804	20,554	54,879

(Continued on next page)

Appendix Table 6 (continued)

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MCF)	Volume by Species (MCF)					
				WP	P	I-D	S	H-AF-GF	IP-MIP
<u>Bitterroot Working Circle</u>	National Forest	605,157	299,110	-	9,227	60,934	19,723	62,944	146,282
	State	15,171	3,780	-	717	1,586	50	389	1,038
	Other Public	120	37	-	-	11	-	10	16
	Forest Industry	17,918	8,006	-	131	1,797	305	1,492	4,281
	Other Private	24,237	8,158	-	1,696	3,279	161	704	2,318
TOTAL		662,603	319,091	-	11,771	67,607	20,239	65,539	153,935

NET VOLUME (PARTIAL CUBIC FEET) POLE- AND SAWTIMBER-SIZE TREES BY SPECIES AND OWNER 1/  
(In Pole and Sawtimber Stands - Stocked Nonreserved Commercial Forest)

Appendix Table 7

Bitterroot Working Circle

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MCF)	Volume by Species (MCF)							
				WP	P	L-D	S	H-AF-GF	LP-WLP	C	
<u>Stevensville Block</u>	National Forest State	76,169	136,239	-	21,419	54,252	19,572	17,175	23,821	-	
	Other Public	1,003	1,591	-	606	746	58	66	115	-	
	Forest Industry	120	132	-	12	75	-	10	35	-	
	Other Private	5,422	9,702	-	1,001	5,043	961	1,027	1,670	-	
	Total	11,324	14,351	-	3,820	7,540	659	581	1,751	-	
<u>Darby Block</u>	National Forest State	167,335	276,296	-	59,394	93,915	34,705	34,370	53,912	-	
	Other Public	2,593	3,830	-	960	2,191	77	163	439	-	
	Forest Industry	11,376	18,744	-	2,209	9,397	1,111	1,903	4,124	-	
	Other Private	9,792	13,401	-	5,265	6,133	281	480	1,242	-	
	Total	191,096	312,271	-	67,828	111,636	36,174	36,916	59,717	-	
<u>Sula Block</u>	National Forest State	146,595	239,521	-	31,943	96,778	28,378	29,845	52,577	-	
	Other Public	11,527	17,244	-	7,620	7,245	469	636	1,274	-	
	Forest Industry	1,120	500	-	12	124	-	-	-	-	
	Other Private	2,458	4,211	-	1,785	1,625	161	105	205	-	
	Total	161,700	261,476	-	41,360	105,772	29,062	30,790	54,492	-	
<u>West Fork Block</u>	National Forest State	215,058	351,487	-	56,428	136,553	45,706	38,711	74,089	-	
	Other Public	48	82	-	35	38	1	2	6	-	
	Forest Industry	-	-	-	-	-	-	-	-	-	
	Other Private	663	1,140	-	113	294	276	189	268	-	
	Total	215,769	352,709	-	56,576	136,885	45,983	38,902	74,363	-	

(Continued on next page)

Appendix Table 7 (continued)

Block and Working Circle	Owner	Stocked Commercial (acres)	Total Volume (MCF)	Volume by Species (MCF)			
				MP	P	L-D	S
<u>Bitterroot Working Circle</u>	National Forest	605,157	1,003,543	-	169,184	381,498	128,361
	State	15,171	22,747	9,221	10,220	605	120,101
	Other Public	120	132	12	75	-	867
	Forest Industry	17,918	28,946	3,222	14,564	2,126	10
	Other Private	24,237	33,103	10,983	15,592	1,377	3,035
<b>TOTAL</b>		<b>662,603</b>	<b>1,088,471</b>	<b>192,622</b>	<b>421,949</b>	<b>132,469</b>	<b>125,467</b>
							<b>215,964</b>

1/ Summary of tables 5 and 6.

NET VOLUME (BOARD FEET) SAWTIMBER-SIZE TREES BY TYPE  
 (Pole and Sawtimber Stands - Nonreserved National-Forest Lands)

Appendix Table 8

STEVENSVILLE BLOCK

Forest Type		Total Volume (MBF)	Volume by Species (MBF)					
	(acres)	WP	P	L-D	S	H-AF-GF	LP-MLP	C
<u>Sawtimber</u>								
D	20,365	168,098	-	139,840	-	3,850	8,238	-
P	14,093	125,807	-	41,354	2,986	1,987	996	-
MLP	635	2,938	-	-	555	512	1,871	-
AF	964	3,675	-	-	1,537	1,184	954	-
S	6,680	74,895	-	-	51,046	16,007	5,883	-
L	3,047	43,904	-	877	6,037	1,749	975	-
Total	45,784	419,317	-	95,531	62,161	25,289	18,917	-
<u>Poletimber</u>								
D	1,934	5,309	-	4,938	-	-	275	-
P	3,107	5,300	-	525	-	-	-	-
LP	21,907	48,413	-	5,909	20,547	12,492	9,465	-
MLP	1,964	2,916	-	-	664	166	2,086	-
AF	867	1,095	-	-	92	583	420	-
S	41	59	-	4	28	15	12	-
L	565	1,621	-	995	490	-	136	-
Total	30,385	64,713	-	4,871	12,371	21,821	12,394	-
BLOCK TOTAL	76,169	484,030	-	100,402	229,790	83,982	38,545	31,311

Appendix Table 8 (continued)

		DARBY BLOCK							
Forest Type	(acres)	Total Volume (MBF)	WP	P	L-D	S	H-AF-GF	LP-WLP	C
<u>Sawtimber</u>									
D	39,263	269,761	-	27,392	217,956	-	4,795	19,618	-
P	42,640	386,072	-	240,023	128,633	8,708	5,803	2,905	-
LP	47	94	-	-	-	-	-	94	-
WLP	1,645	6,862	-	-	-	1,332	1,247	4,283	-
AF	2,926	8,563	-	-	-	2,698	3,147	2,718	-
S	13,136	148,151	-	-	2,385	104,700	30,215	10,851	-
L	52	740	-	15	577	102	30	16	-
<b>Total</b>	<b>99,709</b>	<b>820,243</b>	<b>-</b>	<b>267,430</b>	<b>349,551</b>	<b>117,540</b>	<b>45,237</b>	<b>40,485</b>	<b>-</b>
<u>Poletimber</u>									
D	4,687	18,256	-	58	17,744	-	-	454	-
P	8,297	13,371	-	12,229	1,142	-	-	-	-
LP	48,901	112,978	-	-	19,026	34,864	30,260	28,828	-
WLP	1,789	2,787	-	-	-	315	91	2,381	-
AF	3,922	4,213	-	-	-	528	2,109	1,576	-
S	30	57	-	-	3	30	15	9	-
<b>Total</b>	<b>67,626</b>	<b>151,662</b>	<b>-</b>	<b>12,287</b>	<b>37,915</b>	<b>35,737</b>	<b>32,475</b>	<b>33,248</b>	<b>-</b>
<b>BLOCK TOTAL</b>	<b>167,335</b>	<b>971,905</b>	<b>-</b>	<b>279,717</b>	<b>387,466</b>	<b>153,277</b>	<b>77,712</b>	<b>73,733</b>	<b>-</b>

Appendix Table 8 (continued)

## SULA BLOCK

Forest Type	(acres)	Total Volume (MBF)						Volume by Species (MBF)			
		WP	P	L-D	S	H-AF-GF	LP-WLP	C			
<b>Sawtimber</b>											
D	51,740	375,544	-	37,724	305,832	5,508	7,680	24,308	-	-	-
P	22,965	189,957	-	118,271	60,671	57	3,670	1,837	-	-	-
L-P	212	634	-	-	-	57	-	-	520	-	-
WLP	2,550	6,886	-	-	-	1,530	1,530	3,826	-	-	-
AF	1,504	5,284	-	-	-	2,051	1,774	1,459	-	-	-
S	11,078	114,620	-	-	1,358	76,978	26,368	9,916	-	-	-
Total	90,049	692,925	-	155,995	367,918	86,124	41,022	41,866	-	-	-
<b>Poletimber</b>											
D	5,746	19,894	-	83	18,928	-	-	-	883	-	-
P	759	1,013	-	826	187	-	-	-	-	-	-
L-P	48,270	102,663	-	-	17,275	34,871	24,789	25,728	-	-	-
WLP	70	98	-	-	-	-	-	-	98	-	-
AF	1,495	1,649	-	-	-	213	831	605	-	-	-
S	206	173	-	-	20	79	37	37	-	-	-
Total	56,546	125,490	-	-	909	35,163	25,657	27,351	-	-	-
BLOCK TOTAL	146,595	818,415	-	156,904	404,328	121,287	66,679	69,217	-	-	-

Appendix Table 8 (continued)

		WEST FORK BLOCK							
Forest Type	(acres)	Total Volume (MBF)			Volume by Species (MBF)			LP-WLP	C
		WP	P	L-D	S	H-AF-GF			
<b>Sawtimber</b>									
D	66,552	455,513	-	46,635	367,146	-	8,577	33,155	-
P	40,063	371,678	-	230,313	125,928	7	5,143	2,574	-
LP	408	842	-	-	-	7	-	828	-
WLP	454	1,929	-	-	-	373	348	1,208	-
AF	4,638	16,878	-	-	-	6,793	5,559	4,526	-
S	12,698	153,407	-	-	6,780	103,931	31,316	11,380	-
Total	124,813	1,000,247	-	276,948	499,861	118,824	50,943	53,671	-
<b>Poletimber</b>									
D	12,259	32,806	-	371	29,754	-	-	2,681	-
P	943	1,552	-	1,353	199	-	-	-	-
LP	72,710	145,967	-	-	19,136	64,596	32,852	29,383	-
WLP	110	154	-	-	-	1	-	153	-
AF	3,355	3,298	-	-	-	583	1,576	1,139	-
S	868	1,307	-	-	90	639	333	245	-
Total	90,245	185,084	-	1,724	49,179	65,819	34,761	33,601	-
BLOCK TOTAL	215,058	1,185,331	-	278,672	549,040	184,643	85,704	87,272	-

Appendix Table 8 (continued)

## SUMMARY

Forest Type	(acres)	Total Volume (MBF)		Volume by Species (MBF)				C
		WP	P	L-D	S	H-AF-GF	LP-WLP	
<u>Savtimber</u>								
D	177,920	1,268,916	-	127,921	-	24,902	85,319	-
P	119,761	1,073,514	-	667,091	356,586	16,603	8,312	-
LP	667	1,570	-	-	64	-	1,442	-
WLP	5,284	18,615	-	-	-	3,637	11,188	-
AF	10,032	34,400	-	-	-	13,079	9,657	-
S	43,592	491,073	-	-	-	336,655	38,030	-
L	3,099	44,644	-	-	-	6,139	291	-
Total	360,355	2,932,732	-	795,904	1,434,749	384,649	154,939	-
<u>Poletimber</u>								
D	24,626	76,265	-	608	71,364	-	-	4,293
P	13,106	21,236	-	19,183	2,053	-	-	-
LP	191,788	410,021	-	-	61,346	154,878	100,393	93,404
WLP	3,933	5,955	-	-	-	980	257	4,718
AF	9,639	10,255	-	-	-	1,416	5,099	3,740
S	1,145	1,596	-	-	-	776	400	303
L	565	1,621	-	-	-	995	490	136
Total	244,802	526,949	-	19,791	135,875	158,540	106,149	106,594
GRAND TOTAL	605,157	3,459,681	-	815,695	1,570,624	543,189	268,640	261,533

**NET VOLUME (PARTIAL CUBIC FEET) SAWTIMBER-SIZE TREES BY TYPE  
(Pole and Sawtimber Stands - Nonreserved National-Forest Lands)**

Appendix Table 9

Bitterroot Working Circle

**STEVENVILLE BLOCK**

Forest Type	(acres)	Total Volume (MCF)		Volume by Species (MCF)				IP-WLP	C
		WP	P	L-D	S	H-AF-GF			
<b>Sawtimber</b>									
D	20,365	34,362	-	3,171	-	-	819	1,831	-
P	14,093	25,072	-	15,391	-	597	423	221	-
WLP	635	636	-	-	-	111	109	416	-
AF	964	771	-	-	-	307	252	212	-
S	6,680	15,322	-	-	400	10,209	3,406	1,307	-
L	3,047	8,962	-	-	6,994	1,207	372	217	-
Total	45,784	85,126	-	18,734	44,375	12,431	5,381	4,204	-
<b>Poletimber</b>									
D	1,934	1,088	-	19	1,008	-	-	61	-
P	3,107	1,043	-	936	107	-	-	-	-
L	21,907	10,075	-	-	1,206	4,108	2,658	2,103	-
WLP	1,964	632	-	-	-	133	35	464	-
AF	867	235	-	-	-	18	124	93	-
S	41	14	-	-	-	1	7	3	-
L	565	331	-	-	-	203	98	30	-
Total	30,385	13,418	-	955	2,525	4,364	2,820	2,754	-
<b>BLOCK TOTAL</b>	76,169	98,544	-	19,689	46,900	16,795	8,201	6,958	-

Appendix Table 9 (continued)

DARBY BLOCK

Forest Type	(acres)	Total Volume (MCF)	Volume by Species (MCF)						C
			WP	P	L-D	S	H-AF-GF	LP-WLP	
<u>Sawtimber</u>									
D	39,263	55,236	-	5,372	-	1,020	4,359	-	
P	42,640	76,945	-	47,068	26,254	1,235	646	-	
LP	47	21	-	-	-	-	21	-	
WLP	1,645	1,483	-	-	-	266	952	-	
AF	2,926	1,814	-	-	-	540	604	-	
S	13,136	30,267	-	-	487	20,940	6,429	2,411	-
L	52	151	-	3	118	20	6	4	-
Total	99,709	165,917	-	52,443	71,344	23,508	9,625	8,997	-
<u>Poletimber</u>									
D	4,687	3,734	-	11	3,622	-	-	101	-
P	8,297	2,631	-	2,398	233	-	-	-	-
LP	48,901	23,700	-	-	3,883	6,973	6,438	6,406	-
WLP	1,789	611	-	-	-	63	19	529	-
AF	3,922	904	-	-	-	105	449	350	-
S	30	11	-	-	-	6	3	2	-
Total	67,626	31,592	-	2,409	7,738	7,147	6,909	7,388	-
BLOCK TOTAL	167,335	197,508	-	54,852	79,082	30,655	16,534	16,385	

Appendix Table 9 (continued)

		SULA BLOCK						
Forest Type	(acres)	Total Volume (MCF)		Volume by Species (MCF)		H-AF-GF	LP-WLP	C
		WP	P	L-D	S			
<b>Sawtimber</b>								
D	51,740	76,854	-	7,398	-	-	-	-
P	22,965	37,867	-	23,193	62,420	1,634	5,402	-
LP	212	139	-	-	12,383	781	408	-
WLP	2,550	1,482	-	-	12	11	116	-
AF	1,504	1,111	-	-	-	306	850	-
S	11,078	23,487	-	-	-	410	377	324
Total	90,049	140,940	-	30,591	75,092	15,396	5,610	2,204
						17,225	8,728	9,304
<b>Pole timber</b>								
D	5,746	4,075	-	16	3,863	-	-	196
P	759	200	-	162	38	-	-	-
LP	48,270	21,491	-	-	3,526	6,974	5,274	5,717
WLP	70	22	-	-	-	-	-	22
AF	1,495	354	-	-	-	43	177	134
S	206	36	-	-	4	16	8	8
Total	56,546	26,178	-	178	7,431	7,033	5,459	6,077
BLOCK TOTAL	146,595	167,118	-	30,769	82,523	24,258	14,187	15,381

Appendix Table 9 (continued)

## WEST FORK BLOCK

Forest Type	(acres)	Total Volume (MCF)	Volume by Species (MCF)					
			WP	P	L-D	S	H-AF-GF	LP-WLP
<u>Sawtimber</u>								
D	66,552	93,272	-	9,145	74,934	-	1,825	7,368
P	40,063	74,076	-	45,164	25,702	1	1,094	572
LP	408	186	-	-	-	-	-	184
WLP	454	417	-	-	-	-	74	268
AF	4,638	3,548	-	-	-	1,359	1,183	1,006
S	12,698	31,362	-	-	1,384	20,786	6,663	2,529
Total	124,813	202,861	-	54,309	102,021	23,765	10,839	11,927
<u>Poletimber</u>								
D	12,259	6,742	-	73	6,073	-	-	596
P	943	306	-	265	41	-	-	-
LP	72,710	30,344	-	-	3,906	12,919	6,990	6,529
WLP	110	34	-	-	-	-	-	34
AF	3,355	705	-	-	-	117	335	253
S	868	271	-	-	18	128	71	54
Total	90,245	38,402	-	-	338	10,038	13,164	7,396
BLOCK TOTAL	215,058	241,263	-	54,647	112,059	36,929	18,235	19,393

Appendix Table 9 (continued)

## SUMMARY

Forest Type	(acres)	Total Volume (MCF)	Volume by Species (MCF)					
			WF	P	L-D	S	H-AF-GF	LP-WLP
<b>Sawtimber</b>								
D	177,920	259,724	-	210,380	4,984	5,298	18,960	-
P	119,761	213,959	-	130,816	13	3,533	1,847	-
LP	667	347	-	-	-	-	321	-
WLP	5,284	4,018	-	-	758	774	2,486	-
AF	10,032	7,244	-	-	2,616	2,482	2,146	-
S	43,592	100,437	-	-	67,331	22,107	8,451	-
L	3,099	9,114	-	2,548	1,228	379	221	-
Total	360,355	594,843	-	156,077	7,111	34,573	432	-
<b>Poletimber</b>								
D	24,626	15,639	-	119	14,566	-	-	954
P	13,106	4,180	-	3,761	419	-	-	-
LP	191,788	85,612	-	-	12,520	30,976	21,360	20,756
WLP	3,933	1,298	-	-	-	196	54	1,048
AF	9,639	2,199	-	-	-	283	1,085	831
S	1,145	331	-	-	24	155	85	67
L	565	331	-	-	203	98	-	30
Total	244,802	109,590	-	3,880	27,732	31,708	22,584	23,686
GRAND TOTAL	605,157	704,433	-	159,957	320,563	108,638	57,157	58,118

NET VOLUME (PARTIAL CUBIC FEET) POLETIMBER-SIZE TREES BY TYPE  
(Pole and Sawtimber Stands - Nonreserved National-Forest Land)

Appendix Table 10

Bitterroot Working Circle

		STEVENSVILLE BLOCK					
		Total Volume (MCF)		Volume by Species (MCF)			
Forest Type	(acres)	WIP	P	L-D	S	H-AF-GF	LP-WLP
<u>Sawtimber</u>							
D	20,365	4,628	-	1,783	95	1,311	1,439
P	14,093	1,865	555	913	-	-	397
WLP	635	459	-	8	18	263	170
AF	964	194	-	-	53	61	80
S	6,680	4,403	-	-	523	2,931	939
L	3,047	979	-	10	233	282	230
Total	45,784	12,528	-	2,948	922	4,848	3,255
<u>Poletimber</u>							
D	1,934	2,036	-	29	41	41	440
P	3,107	1,427	-	1,146	-	-	62
LP	21,907	18,766	-	2,065	1,613	2,551	12,537
WLP	1,964	1,349	-	-	-	1,007	342
AF	867	628	-	-	-	474	139
S	41	58	-	-	15	4	16
L	565	903	-	-	38	49	72
Total	30,385	25,167	-	1,175	147	4,126	13,608
BLOCK TOTAL	76,169	37,695	-	1,730	7,352	2,776	8,974
							16,863

Appendix Table 10 (continued)

Forest Type	(acres)	DARBY BLOCK						Volume by Species (MCF)		
		Total Volume (MCF)	WP	P	L-D	S	H-AF-GF	LP-WLP	C	
<b>Sawtimber</b>										
D	39,263	-	-	3,545	117	2,690	3,520	-	-	
P	42,640	5,561	1,560	2,841	-	-	1,160	28	-	
LP	47	33	-	-	17	35	619	436	-	
WLP	1,645	1,107	-	-	-	125	152	212	-	
AF	2,926	489	-	-	-	5	1,116	6,008	1,857	
S	13,136	8,986	-	-	-	4	4	6	4	
L	52	18	-	-	-	6,412	1,402	9,475	7,217	
Total	<u>99,709</u>	<u>26,066</u>	<u>1,560</u>	<u>6,412</u>	<u>1,402</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	
<b>Poletimber</b>										
D	4,687	5,140	-	15	4,224	174	174	553	-	
P	8,297	3,653	-	2,967	494	-	-	192	-	
LP	48,901	40,245	-	-	3,702	2,061	5,877	28,605	-	
WLP	1,789	1,045	-	-	-	1	656	388	-	
AF	3,922	2,589	-	-	-	382	1,651	556	-	
S	30	50	-	-	-	30	3	16	-	
Total	<u>67,626</u>	<u>52,722</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>8,421</u>	<u>2,648</u>	<u>8,361</u>	<u>30,310</u>	
BLOCK TOTAL	<u>167,335</u>	<u>78,788</u>	<u>-</u>	<u>4,542</u>	<u>14,833</u>	<u>4,050</u>	<u>17,836</u>	<u>37,527</u>	<u>-</u>	

Appendix Table 10 (continued)

Forest Type	(acres)	Total Volume (MCF)		SULA BLOCK		Volume by Species (MCF)		C
		WP	P	L-D	S	H-AF-GP	LP-WLP	
<b>Sawtimber</b>								
D	51,740	12,578	"	4,536	192	3,512	4,338	-
P	22,965	2,860	-	1,200	-	-	733	-
LP	212	267	-	4	14	-	249	-
WLP	2,550	1,300	-	-	-	637	663	-
AF	1,504	274	-	-	72	83	119	-
S	11,078	7,318	-	1	819	4,873	1,625	-
Total	<u>90,049</u>	<u>24,597</u>	<u>-</u>	<u>927</u>	<u>1,097</u>	<u>9,105</u>	<u>7,727</u>	-
<b>Pole timber</b>								
D	5,746	5,938	-	26	4,908	175	175	654
P	759	316	-	221	76	-	-	19
LP	48,270	40,213	-	-	3,527	2,579	5,675	28,432
WLP	70	32	-	-	-	-	14	18
AF	1,495	1,096	-	-	-	132	683	281
S	206	211	-	-	3	137	6	65
Total	<u>56,546</u>	<u>47,806</u>	<u>-</u>	<u>247</u>	<u>8,514</u>	<u>3,023</u>	<u>6,553</u>	<u>29,469</u>
BLOCK TOTAL	146,595	72,403	-	1,174	14,255	4,120	15,658	37,196

Appendix Table 10 (continued)

Forest Type	(acres)	WEST FORK BLOCK				Volume by Species (MCF)			
		Total Volume (MCF)	WP	P	L-D	S	H-AF-GF	LP-WLP	C
<b>Sawtimber</b>									
D	66,552	16,647	-	-	5,876	214	4,606	5,951	-
P	40,063	5,173	-	1,340	2,806	-	-	1,027	-
LP	408	300	-	-	-	44	-	256	-
WLP	454	309	-	-	5	10	174	120	-
AF	4,638	899	-	-	-	249	283	367	-
S	12,698	8,192	-	-	48	1,004	5,429	1,711	-
Total	124,813	31,520	-	1,340	8,735	1,521	10,492	9,432	-
<b>Poletimber</b>									
D	12,259	11,815	-	110	9,396	234	234	1,841	-
P	943	435	-	331	84	-	-	20	-
LP	72,710	62,545	-	-	6,269	5,753	8,299	42,224	-
WLP	110	50	-	-	-	-	23	27	-
AF	3,355	2,626	-	-	-	479	1,361	786	-
S	868	1,233	-	-	10	790	67	366	-
Total	90,245	78,704	-	441	15,759	7,256	9,984	45,264	-
BLOCK TOTAL	215,058	110,224	-	1,781	24,494	8,777	20,476	54,696	-

Appendix Table 10 (continued)

		SUMMARY						Volume by Species (MCF)			
Forest Type	(acres)	Total Volume (MCF)		WP P		I-D		S	H-AF-GF	LP-WLP	C
<u>Sawtimber</u>											
D	177,920	43,725	-	4,382	-	15,740	618	12,119	15,248	-	
P	119,761	15,459	-	-	-	7,760	-	-	3,317	-	
LP	667	600	-	-	-	4	63	-	533	-	
WLP	5,284	3,175	-	-	-	30	63	1,693	1,389	-	
AF	10,032	1,856	-	-	-	-	499	579	778	-	
S	43,592	28,899	-	-	-	64	3,462	19,241	6,132	-	
L	3,099	997	-	-	-	238	237	288	234	-	
Total	360,355	94,711	-	4,382	-	23,836	4,942	33,920	27,631	-	
<hr/>											
<u>Poletimber</u>											
D	24,626	24,929	-	4,180	20,013	624	624	3,488	-		
P	13,106	5,831	-	4,665	873	-	-	-	293	-	
LP	191,788	161,769	-	-	15,563	12,006	22,402	111,798	-		
WLP	3,933	2,476	-	-	-	1	1,700	775	-		
AF	9,639	6,939	-	-	-	1,008	4,169	1,762	-		
S	1,145	1,552	-	-	-	995	80	463	-		
L	565	903	-	-	-	147	49	72	-		
Total	244,802	204,399	-	4,845	37,098	14,781	29,024	118,651	-	-	
GRAND TOTAL	605,157	299,110	-	9,227	60,934	19,723	62,944	146,282	-	-	

NET VOLUME (PARTIAL CUBIC FEET) OF SAWTIMBER- AND POLETIMBER-SIZE TREES BY TYPE  
(Pole- and Sawtimber-Size Stands - Nonreserved National-Forest Land)

Appendix Table 11

Bitterroot Working Circle

STEVENSVILLE BLOCK

Forest Type	(acres)	Total Volume (MCF)		Volume by Species (MCF)			
		WP	P	L-D	S	H-AF-GF	LP-WLP
<b>Sawtimber</b>							
D	20,365	38,990	-	3,171	95	2,130	3,270
P	14,093	26,937	-	15,946	597	423	618
WLP	635	1,095	-	-	129	372	586
AF	964	965	-	-	360	313	292
S	6,680	19,725	-	-	10,732	6,337	2,246
L	3,047	9,941	-	172	1,440	654	447
Total	45,784	97,654	-	19,289	13,353	10,229	7,459
<b>Poletimber</b>							
D	1,934	3,124	-	48	2,493	41	501
P	3,107	2,470	-	2,082	326	-	62
LP	21,907	28,841	-	-	3,271	5,721	14,640
WLP	1,964	1,981	-	-	-	133	806
AF	867	863	-	-	-	33	232
S	41	72	-	-	1	45	19
L	565	1,234	-	-	838	245	102
Total	30,385	38,585	-	2,130	6,929	6,218	16,362
BLOCK TOTAL	76,169	136,239	-	21,419	54,252	19,571	17,175
						23,821	-

Appendix Table 11 (continued)

		DARBY BLOCK						Volume by Species (MCF)		
Forest Type	(acres)	Total Volume (MCF)		L-D		S	H-AF-GF	LP-WLP	C	
<u>Sawtimber</u>										
D	39,263	65,108	-	48,030	117	3,710	7,879	-		
P	42,640	82,506	5,372	29,095	1,742	1,235	1,806	-		
LP	47	54	48,628	-	5	-	49	-		
WLP	1,645	2,590	-	17	301	884	1,388	-		
AF	2,926	2,303	-	-	665	822	816	-		
S	13,136	39,253	-	492	22,056	12,437	4,268	-		
L	52	169	3	122	24	12	8	-		
Total	99,709	191,983	574,003	77,756	24,910	19,100	16,214	-		
<u>Poletimber</u>										
D	4,687	8,874	-	7,846	174	174	654	-		
P	8,297	6,284	26	7,727	-	-	192	-		
LP	48,901	63,945	5,365	7,585	9,034	12,315	35,011	-		
WLP	1,789	1,656	-	-	64	675	917	-		
AF	3,922	3,493	-	-	487	2,100	906	-		
S	30	61	-	1	36	6	18	-		
Total	67,626	84,313	5,391	16,159	9,795	15,270	37,698	-		
BLOCK TOTAL	167,335	276,296	-	59,394	93,915	34,705	34,370	53,912	-	

Appendix Table 11 (continued)

Forest Type	(acres)	Total Volume (MCF)	SULA BLOCK				Volume by Species (MCF)
			WP	P	L-D	S	
<b>Sawtimber</b>							
D	51,740	89,432	-	7,398	66,956	192	5,146
P	22,965	40,727	-	24,120	13,583	1,102	781
LP	212	406	-	-	16	25	-
WLP	2,550	2,782	-	-	-	306	963
AF	1,504	1,385	-	-	-	482	460
S	11,078	30,805	-	-	-	16,215	10,483
Total	<u>90,049</u>	<u>165,537</u>	<u>-</u>	<u>31,518</u>	<u>80,833</u>	<u>18,322</u>	<u>17,833</u>
<b>Poletimber</b>							
D	5,746	10,013	-	42	8,771	175	175
P	759	516	-	383	114	-	850
LP	48,270	61,704	-	-	7,053	9,553	-
WLP	70	54	-	-	-	175	10,949
AF	1,495	1,450	-	-	-	153	14
S	206	247	-	-	-	10,056	860
Total	<u>56,546</u>	<u>73,984</u>	<u>-</u>	<u>425</u>	<u>15,945</u>	<u>-</u>	<u>12,012</u>
BLOCK TOTAL	146,595	239,521	-	31,943	96,778	28,378	29,845
							52,577

Appendix Table 11 (continued)

		WEST FORK BLOCK						Volume by Species (MCF)						
		Total Volume (MCF)		WP		P		L-D		S		H-AF-GF	LP-WLP	C
Forest Type	(acres)													
Sawtimber														
D	66,552	109,919	-	9,145		80,810		214		6,431	13,319	-		
P	40,063	79,249	46,504	-		28,508	1	1,544	1,094	1,599	1,440	-		
LP	408	486	-	-			5	45	-	248	388	-		
WLP	454	726	-	-				85		1,466	1,373	-		
AF	4,638	4,447	-	-				1,608		12,092	4,240	-		
S	12,698	39,554	-					21,790		21,331	21,359	-		
Total	124,813	234,381	-	55,649		110,756		25,286		-	-	-		
Poletimber														
D	12,259	18,557	-	183		15,469		234		234	2,437	-		
P	943	741	-	596		125		-		-	20	-		
LP	72,710	92,889	-	-		10,175		18,672		15,289	48,753	-		
WLP	110	84	-	-		-		-		23	61	-		
AF	3,355	3,331	-	-		-		-		1,696	1,039	-		
S	868	1,504	-				28	918		138	420	-		
Total	90,245	117,106	-	779		25,797		20,420		17,380	52,730	-		
BLOCK TOTAL	215,058	351,487	-	56,428		136,553		45,706		38,711	74,089	-		

Appendix Table 11 (continued)

## BITTERROOT WORKING CIRCLE

Forest Type	(acres)	Total Volume (MCF)						Volume by Species (MCF)			
		WP	P	L-D	S	H-AF-GF	LP-WIP	C			
<b>Sawtimber</b>											
D	177,920	303,449	-	25,086	226,120	618	17,417	3,712	-		
P	119,761	229,418	-	135,198	80,539	4,984	3,533	5,164	-		
LP	667	947	-	-	17	76	-	854	-		
WLP	5,284	7,193	-	-	30	821	2,467	3,875	-		
AF	10,032	9,100	-	-	-	3,115	3,061	2,924	-		
S	43,592	129,336	-	-	2,612	70,793	41,348	14,583	-		
L	3,099	10,111	-	175	7,349	1,465	667	455	-		
Total	360,355	689,554	-	160,459	316,667	81,872	-	68,493	62,063	-	
<b>Poletimber</b>											
D	24,626	40,568	-	299	34,579	624	4,442	-			
P	13,106	10,011	-	8,426	1,292	-	-	293	-		
LP	191,788	247,381	-	-	28,083	42,982	43,762	132,554	-		
WLP	3,933	3,774	-	-	-	197	1,754	1,823	-		
AF	9,639	9,138	-	-	-	1,291	5,254	2,593	-		
S	1,145	1,863	-	-	38	1,150	165	530	-		
L	565	1,234	-	-	838	245	49	102	-		
Total	244,802	313,989	-	8,725	64,830	46,489	-	51,608	142,337	-	
GRAND TOTAL	605,157	1,003,543	-	169,184	381,497	128,361	120,101	204,400	-		

**NET VOLUME (PARTIAL CUBIC FEET) PER ACRE BY STRATA**  
 Nonreserved National Forest Land

A. Sawtimber-Size Trees (11.0+ DBH)

Appendix Table 12

Bitterroot Working Circle

Strata	W	P	L	D	Cubic Feet per Acre by Species						Hdw.	Total	
					S	AF	GF	H	IP	MIP	C		
D9W	-	200	-	3,060	-	-	-	-	20	-	-	-	3,280
D9M	-	220	-	2,260	-	-	-	-	20	-	-	-	2,590
D9P	-	100	-	530	-	-	-	-	160	-	-	-	790
D8W	-	-	-	980	-	-	-	-	-	-	-	-	980
D8M	-	-	-	200	120	-	-	-	-	40	-	-	360
D8P	-	-	-	200	-	-	-	-	-	110	-	-	310
P9W	-	1,960	-	1,020	-	-	-	-	-	-	-	-	2,980
P9M	-	1,590	-	1,060	-	-	-	-	-	-	-	-	2,650
P9P	-	860	-	400	60	40	-	-	20	-	-	-	1,380
P8W	-	550	-	-	-	-	-	-	-	-	-	-	550
P8M	-	350	-	100	-	-	-	-	-	-	-	-	450
P8P	-	60	-	20	-	-	-	-	-	-	-	-	80
LP9W	-	-	-	-	-	-	-	-	-	-	-	-	-
LP9M	-	-	-	-	-	-	-	-	-	-	-	-	-
LP9P	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8W	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8M	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8P	-	-	-	-	-	-	-	-	-	-	-	-	-

(Continued on next page)

Strata	Cubic Feet per Acre by Species										Hdw.	Total
	W	P	L	D	S	AF	GF	H	IP	WLP	C	
WLP9M	-	-	-	-	280	260	-	-	270	1,000	-	-
WLP9P	-	-	-	-	120	130	-	-	40	290	-	1,810
-	-	-	-	-	20	40	-	-	40	890	-	580
WLP8W	-	-	-	-	80	20	-	-	90	160	-	-
WLP8M	-	-	-	-	-	20	-	-	70	220	-	990
WLP8P	-	-	-	-	-	-	-	-	-	-	-	350
-	-	-	-	-	400	210	-	-	220	-	-	310
AF9W	-	-	-	-	800	380	-	-	270	-	-	-
AF9M	-	-	-	-	120	210	-	-	160	40	-	830
AF9P	-	-	-	-	-	-	-	-	-	-	-	1,450
-	-	-	-	-	-	-	-	-	-	-	-	530
AF8W	-	-	-	-	-	60	90	-	20	20	-	-
AF8M	-	-	-	-	-	20	150	-	70	40	-	190
AF8P	-	-	-	-	-	40	40	-	20	20	-	280
-	-	-	-	-	900	3,000	-	-	290	-	-	120
S9W	-	-	-	-	40	2,160	430	-	130	-	-	-
S9M	-	-	-	-	-	120	830	-	290	-	-	5,000
S9P	-	-	-	-	-	-	-	-	-	-	-	2,760
-	-	-	-	-	-	-	-	-	-	-	-	1,240
S8W	-	-	-	-	-	20	200	110	-	70	-	-
S8M	-	-	-	-	-	20	100	60	-	70	-	400
S8P	-	-	-	-	-	20	60	20	-	20	-	250
-	-	-	-	-	-	-	-	-	-	-	-	120
L9W	-	-	-	-	60	3,120	1,260	880	90	90	-	-
L9M	-	-	-	-	140	2,060	820	740	90	40	-	5,500
L9P	-	-	-	-	-	1,610	200	140	150	90	-	3,890
-	-	-	-	-	-	-	-	-	-	-	-	2,190
L8W	-	-	-	-	-	310	60	200	-	40	-	-
L8M	-	-	-	-	-	200	100	-	-	110	-	610
-	-	-	-	-	-	-	-	-	-	-	-	410

B. Poletimber-Size Trees (5.0-10.9 DBH)

Appendix Table 12 (continued)

Strata	W	P	L	D	Cubic Feet per Acre by Species						Total	
					S	AF	GF	H	LP	WLP	C	
D9W	-	-	-	200	-	50	-	-	-	-	-	200
D9M	-	-	-	80	10	80	-	-	-	-	-	150
D9P	-	-	-	90	-	-	-	-	-	-	-	300
D8W	-	-	-	1,000	50	50	-	-	-	-	-	1,200
D8M	-	-	30	590	-	-	-	-	-	-	-	990
D8P	-	-	-	650	-	-	-	-	-	-	-	650
P9W	-	-	-	-	-	-	-	-	-	-	-	-
P9M	-	-	100	-	200	-	-	-	-	-	-	300
P9P	-	-	50	-	140	-	-	-	-	-	-	140
P8W	-	-	-	50	-	-	-	-	-	-	-	120
P8M	-	-	590	-	200	-	-	-	-	-	-	590
P8P	-	-	420	-	50	-	-	-	-	-	-	620
P8	-	-	150	-	-	-	-	-	-	-	-	250
LP9W	-	-	-	-	-	40	-	-	-	-	-	-
LP9M	-	-	-	-	-	20	60	-	-	-	-	740
LP9P	-	-	-	-	-	-	110	-	-	-	-	1,320
LP8W	-	-	-	-	-	100	160	100	-	-	-	700
LP8M	-	-	-	-	-	120	20	130	-	-	-	-
LP8P	-	-	-	-	-	10	-	120	-	-	-	-
WLP9M	-	-	-	-	-	40	80	730	-	-	-	-
WLP9P	-	-	-	-	-	-	-	250	-	-	-	-
WLP8W	-	-	-	-	-	-	20	400	-	-	-	-
WLP8M	-	-	-	-	-	-	-	570	-	-	-	-
WLP8P	-	-	-	-	-	-	-	-	200	-	-	-
										380	-	800
										160	-	730
										250	-	450

Appendix Table 12 (continued)

Strata	Cubic Feet per Acre by Species										Hdw.	Total	
	W	P	L	D	S	AF	GF	H	LP	WLP	C		
AF9W	-	-	-	-	-	450	450	-	-	200	-	-	1,100
AF9M	-	-	-	-	-	70	70	-	-	100	-	-	240
AF9P	-	-	-	-	-	40	50	-	-	70	-	-	160
AF8W	-	-	-	-	-	200	550	-	-	680	-	-	1,430
AF8M	-	-	-	-	-	-	570	-	-	160	-	-	730
AF8P	-	-	-	-	-	300	100	-	-	80	-	-	480
S9W	-	-	-	-	-	40	70	200	-	40	-	-	350
S9M	-	-	-	-	-	-	120	520	-	130	-	-	770
S9P	-	-	-	-	-	-	10	330	-	170	-	-	510
S8W	-	-	-	-	-	20	1,000	110	-	520	-	-	1,650
S8M	-	-	-	-	-	10	900	50	-	330	-	-	1,290
S8P	-	-	-	-	-	20	500	20	-	300	-	-	840
L9W	-	-	-	-	-	-	-	-	-	-	-	-	400
L9M	-	-	-	-	-	100	50	200	-	-	-	-	550
L9P	-	-	-	-	-	100	70	180	-	160	-	-	160
L8W	-	-	-	-	-	10	-	-	-	50	-	-	-
L8M	-	-	-	-	-	800	400	300	100	-	100	-	1,700
						500	130	-	-	300	-	-	930

(Continued on next page)

C. Sawtimber- and Pole-Size Trees

Appendix Table 12 (continued)

Strata	W	P	L	D	Cubic Feet per Acre by Species					WLP	C	Hdw.	Total
					S	AF	GF	H	LP				
D9W	-	200	-	3,260	-	140	-	-	20	-	-	-	3,480
D9M	-	220	-	2,340	10	80	-	-	30	-	-	-	2,740
D9P	-	100	-	620	-	-	-	-	290	-	-	-	1,090
D8W	-	-	-	1,980	50	50	-	-	100	-	-	-	2,180
D8M	-	30	-	790	120	-	-	-	410	-	-	-	1,350
D8P	-	-	-	850	-	-	-	-	110	-	-	-	960
P9W	-	-	-	1,220	-	-	-	-	-	-	-	-	3,280
P9M	-	2,060	-	1,220	-	-	-	-	-	-	-	-	2,790
P9P	-	1,590	-	1,200	-	-	-	-	-	-	-	-	1,500
P8W	-	-	1,430	60	40	-	-	-	60	-	-	-	1,140
P8M	-	1,140	-	300	-	-	-	-	-	-	-	-	1,070
P8P	-	770	-	70	-	-	-	-	-	-	-	-	330
LP9W	-	-	-	-	-	-	-	-	-	-	-	-	-
LP9M	-	-	-	-	-	-	-	-	-	-	-	-	-
LP9P	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8W	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8M	-	-	-	-	-	-	-	-	-	-	-	-	-
LP8P	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP9M	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP9P	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP8W	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP8M	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP8P	-	-	-	-	-	-	-	-	-	-	-	-	-

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Appendix Table 12 (continued)

Strata	Cubic Feet per Acre by Species										Hdw.	Total
	W	P	L	D	S	AF	GF	H	LP	WLP		
AF9W	-	-	-	-	850	660	-	-	420	-	-	1,930
AF9M	-	-	-	-	870	450	-	-	370	-	-	1,690
AF9P	-	-	-	-	160	260	-	-	230	40	-	1,690
AF8W	-	-	-	-	260	640	-	-	700	20	-	1,620
AF8M	-	-	-	-	20	720	-	-	230	40	-	1,010
AF8P	-	-	-	-	340	140	-	-	100	20	-	600
S9W	-	-	-	-	940	3,070	1,010	-	-	-	-	-
S9M	-	-	-	-	40	2,280	950	-	-	-	-	5,350
S9P	-	-	-	-	-	130	1,160	-	-	-	-	3,530
S8W	-	-	-	-	40	1,200	220	-	-	-	-	1,750
S8M	-	-	-	-	30	1,000	110	-	-	-	-	-
S8P	-	-	-	-	40	560	40	-	-	-	-	-
L9W	-	-	-	-	60	3,220	1,310	1,080	-	-	-	-
L9M	-	-	-	-	140	2,160	890	920	90	-	-	5,900
L9P	-	-	-	-	-	1,620	200	140	250	-	-	4,440
L8W	-	-	-	-	-	1,010	560	500	100	-	-	2,350
L8M	-	-	-	-	-	600	330	-	-	-	-	-
												2,310
												1,340

NET VOLUME (BOARD FEET) PER ACRE BY STRATA  
Nonreserved National-Forest Land

Sawtimber-Size Trees (11.0 DBH)

Appendix Table 13

Bitterroot Working Circle

Strata	Board Feet per Acre by Species										Total
	W	P	L	D	S	AF	GF	H	LP	WLP	
D9M	-	1,000	-	15,000	-	-	-	-	100	-	-
D9M	-	1,100	-	11,100	-	-	-	-	100	-	-
D9P	-	500	-	2,600	-	-	-	-	700	-	-
D8W	-	-	-	4,800	-	-	-	-	-	-	-
D8M	-	-	-	1,000	600	-	-	-	200	-	-
D8P	-	-	-	1,000	-	-	-	-	500	-	-
P9W	-	10,000	-	5,000	-	-	-	-	-	-	-
P9M	-	8,100	-	5,200	-	-	-	-	-	-	-
P9P	-	4,400	-	2,000	300	-	-	-	200	-	-
P8W	-	2,800	-	500	-	-	-	-	-	-	-
P8M	-	1,800	-	100	-	-	-	-	-	-	-
P8P	-	300	-	-	-	-	-	-	-	-	-
LP9W	-	-	-	1,900	1,000	-	-	-	5,600	200	-
LP9M	-	-	-	300	300	-	-	-	2,300	200	-
LP9P	-	-	-	-	-	-	-	-	1,700	300	-
LP8W	-	-	-	1,200	-	-	-	-	-	-	-
LP8M	-	-	-	1,000	1,200	-	-	-	700	-	-
LP8P	-	-	-	600	100	300	-	-	800	-	-

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Appendix Table 13 (continued)

Strata	Board Feet per Acre by Strata										Total
	W	P	L	D	S	AF	GF	H	LP	WLP	
MLP9M	-	-	-	-	1,400	1,200	-	-	1,200	4,500	-
MLP9P	-	-	-	-	600	600	-	-	200	1,300	-
MLP8W	-	-	-	-	100	200	-	-	200	4,000	-
MLP8M	-	-	-	-	400	100	-	-	400	700	-
MLP8P	-	-	-	-	-	100	-	-	300	1,000	-
AF9W	-	-	-	-	-	-	-	-	-	1,000	-
AF9M	-	-	-	-	-	-	-	-	-	1,200	-
AF9P	-	-	-	-	-	-	-	-	700	200	-
AF8W	-	-	-	-	-	-	-	-	-	-	-
AF8M	-	-	-	-	-	-	-	-	-	-	-
AF8P	-	-	-	-	-	-	-	-	-	-	-
SSW	-	-	-	-	-	300	400	-	100	100	900
SSM	-	-	-	-	-	100	700	-	300	200	1,300
SSP	-	-	-	-	-	200	200	-	100	100	600
SSW	-	-	-	-	-	-	-	-	-	-	-
SSM	-	-	-	-	-	-	-	-	-	-	-
SSP	-	-	-	-	-	-	-	-	-	-	-
SSW	-	-	-	-	-	-	-	-	-	-	-
SSM	-	-	-	-	-	-	-	-	-	-	-
SSP	-	-	-	-	-	-	-	-	-	-	-
L9W	-	-	-	-	-	-	-	-	-	-	-
L9M	-	-	-	-	300	15,300	6,200	4,400	-	400	-
L9P	-	-	-	-	700	10,100	4,000	3,700	700	200	-
L9P	-	-	-	-	-	7,900	1,000	700	-	400	-
L8W	-	-	-	-	-	1,500	300	1,000	-	200	-
L8M	-	-	-	-	-	1,000	500	-	-	500	-

CONVERTING FACTORS

National-Forest Lands

Appendix Table 14

Bitterroot Working Circle

a. Board Foot - Cubic Foot Ratio - Sawtimber-Size Trees:

<u>Species</u>	<u>Ratio</u>
DF	4.9
P	5.1
LP	4.5
WLP	4.5
AF	4.7
S	5.0
WL	4.9

b. Board Foot - Cubic Foot Ratio for Pole-Size Trees:

$$2.5 \text{ Board Feet} = 1 \text{ Cubic Foot}$$

c. Cubic Foot - Cord Ratio for Pole-Size Trees:

$$90 \text{ Cubic Feet} = 1 \text{ Cord}$$

d. Board Foot - Cord Ratios:

1. Sawtimber-Size Trees:

$$2 \text{ Cords} = 1 \text{ M Board Feet}$$

2. Pole-Size Trees:

$$3 \text{ Cords} = 1 \text{ M Board Feet}$$

PERIODIC ANNUAL INCREMENT AND MORTALITY BY TYPES  
POLE AND SAWTICKER STANDS

(Nonreserved National-Forest Lands)

Appendix Table 15

Bitterroot Working Circle

Forest Type	Com'1 Forest Area (acres)	Gross PAI / acre (CF)	Mort. 1/ acre (CF)	Net PAI / acre (CF)	Percent Volume Sawt.	Net PAI / acre (CF)	Cu.Ft. Bd.Ft. Ratio	Mort. Sawt. PAI/acre (BF)	Net Sawt. PAI/acre (BF)	Total Sawt. Mort. (MBF)	Total Net PAI Sawt. Mort. (MBF)	Other (MCF)
L-D9	181,019	27	3	24	85.7	20.6	3.4	4.9	3.0	101	2,661	18,283
L-D8	25,191	20	0	20	38.2	7.6	12.4	4.9	.0	37	0	932
P9	119,761	21	1	20	93.3	18.7	1.3	5.1	1.0	95	611	11,377
P8	13,106	22	0	22	41.7	9.2	12.8	5.1	.0	47	0	616
S9	43,592	43	6	37	77.4	28.6	8.4	5.0	6.0	143	1,308	6,234
S8	1,145	26	1	25	17.6	4.4	20.6	5.0	1.0	22	3	25
AF9	10,032	27	3	24	79.6	19.1	4.9	4.7	3.0	90	141	366
AF8	9,639	20	0	20	24.1	4.8	15.2	4.7	.0	22	0	212
LP-WIP9	5,951	29	1	28	53.6	15.0	13.0	4.5	1.0	67	26	399
LP-WIP8	195,721	29	1	28	34.6	9.7	18.3	4.5	1.0	44	881	8,612
TOTAL	605,157											5,631
												47,593
												5,495

1/ Based on average PAI past 10 years--1951-1960.

2/ Average annual mortality past 5 years--1956-1960.

PRESENT MEAN ANNUAL INCREMENT BY TYPES  
 (Nonreserved National-Forest Lands)

Appendix Table 16

Bitterroot Working Circle

Forest Type	Rotation	Site	Area	Mean Annual Increment <sup>1/</sup>			Other Products	Total <sup>2/</sup>
				Per Acre	Sawtimber	Total		
L-D	years 160	IV	acres 212,349	BF 46	MBF 9,768	CF 4.5		MCF 955
P	140	IV	135,471	70	9,483	.8	108	
Spruce	140	III-IV	47,760	87	4,155	7.2	344	
AF	140	IV	21,237	40	849	5.4	114	
LP-WLP	120	IV-V	146,248 <sup>3/</sup>	21	3,071	10.7	1,565	
LP-WLP	100	IV-V	146,248 <sup>3/</sup>	-	-	11.6	1,696	
<b>TOTAL</b>			<b>709,313</b>		<b>27,326</b>			<b>4,782</b>

<sup>1/</sup> MAI obtained from growth of present sawtimber stands over period of their existence.

<sup>2/</sup> Conversion of cubic contents of 5"-9" material to cords at ratio of 90.

<sup>3/</sup> One half of lodgepole type will not produce sawtimber products.

SUSTAINED YIELD CAPACITY BY TYPES  
(Nonreserved National-Forest Lands)

Appendix Table 17

Bitterroot Working Circle

Forest Type	Rotation years	Site	Area acres	Normal MAI/acre <u>1/</u>			Realizable MAI/acre <u>2/</u>				
				Sawt.		Total	Sawt.		Total		
				<u>BF</u>	<u>CF</u>	<u>MBF</u>	<u>CF</u>	<u>BF</u>	<u>MBF</u>		
L-D	160	IV	212,349	118	19	25,057	4,035	83	13.0	17,625	2,760
P	140	IV	135,471	231	2	31,293	271	162	1.5	21,946	203
Spruce	140	III-IV	47,760	234	23	11,176	1,098	164	16.0	7,833	764
AF	140	IV	21,237	160	25	3,398	531	112	17.5	2,378	376
LP-WLP	110	IV-V	292,496	50	35	14,625	10,237	35	24.5	10,237	7,166
TOTAL			709,313			85,549	16,172			60,019	11,269

1/ From "Tables of Yields and Mean Annual Increment of Fully Stocked Stands in Major Forest Types of Region."

2/ 70 percent of full stocking.

AREA OF AGE CLASSES BY TYPES <sup>1/</sup>  
 (Nonreserved Commercial National-Forest Lands)

Appendix Table 18

Bitterroot Working Circle

Age Class	Major Forest Types in Acres					Total Acres
	L-D	P	AF	S	WLP-LP	
1- 20	2,244	637	-	-	10,000	12,881
21- 40	2,244	500	1,191	1,706	83,276	88,917
41- 60	6,187	7,972	-	-	20,167	34,326
61- 80	6,187	15,944	-	-	20,167	42,298
81-100	12,372	15,944	2,164	4,921	6,050	41,451
101-120	12,372	15,944	1,180	2,684	30,252	62,432
121-140	16,497	3,986	1,180	2,684	40,335	64,682
141-160	51,552	11,958	2,164	4,921	24,200	94,795
161-180	28,869	7,972	4,328	9,843	24,200	75,212
181-200	20,621	7,972	1,180	2,684	6,050	38,507
200+	51,553	45,175	7,475	17,000	20,167	141,370
<b>Subtotal</b>	<b>210,698</b>	<b>134,004</b>	<b>20,862</b>	<b>46,443</b>	<b>284,864</b>	<b>696,871</b>
Nonstocked	1,651	1,467	375	1,317	7,632	12,442
<b>TOTAL</b>	<b>212,349</b>	<b>135,471</b>	<b>21,237</b>	<b>47,760</b>	<b>292,496</b>	<b>709,313</b>

<sup>1/</sup> From inventory plots sampled in 1959.

AREA BY SITE AND TYPE  
 (Nonreserved Commercial National-Forest Lands)

Appendix Table 19

Bitterroot Working Circle

Forest Type	Site		
	Good	Medium	Poor
	Percent		
Douglas-fir	3	8	89
Ponderosa Pine	20	60	20
Lodgepole Pine	14	42	44
Engelmann Spruce	6	39	55

LOG GRADES BY SPECIES  
 (Nonreserved Commercial National-Forest Lands)

Appendix Table 20

Bitterroot Working Circle

Species	Log Grades				
	1	2	3	4	Percent
Douglas-fir	2	9	33	56	
Ponderosa Pine	15	21	12	52	
Lodgepole Pine	15	20	40	25	
Subalpine Fir	-	3	65	32	
Engelmann Spruce	1	12	50	37	

SALVABLE DEAD AND USABLE CULL 1/

Appendix Table 21

Bitterroot Working Circle

Forest Type	Com'l Forest Area (acres)	Salvable Dead		Usable Cull		Total Usable (M cords)
		Per Acre (cords)	Total (M cords)	Per Acre (cords)	Total (M cords)	
L-D	181,019	2	362	2	362	724
P	119,761	3	359	1	120	479
LP-WLP	201,672	10	2,017	2	403	2,420
S-AF	53,624	4	214	1	53	267
TOTAL	556,076		2,952		938	3,890

1/ Based upon area of sawtimber and poletimber stands for the LP-WLP type and area of sawtimber stands for all other types.

CALCULATION OF ANNUAL ALLOWABLE HARVEST CUT OF SAWTIMBER  
 (Nonreserved National-Forest Commercial Forest Lands)

Appendix Table 22

A. KEMP FORMULA

$$AAC = \left( \frac{7A_m + 5A_p + 3A_s + A_r}{4R} \right) V_m$$
  
 Am = Area of sawtimber stands  
 Ap = Area of pole stands  
 As = Area of seedling and sapling stands  
 Ar = Area restocking  
SAWTIMBER

AAC = Annual Allowable Cut  
 R = Rotation  
 $\frac{1}{4}$  = Number of stands  
 Vm = Ave. Vol. per ac. sawt. stands

Forest Type	Rotation (yrs.)	Area Calculation	AAC		
			Area (acres)	Per Acre (BF)	Total (MBF)
L-D	160	$(\underline{7 \times 181,019}) + (\underline{5 \times 25,191}) + (\underline{3 \times 4,488}) + (\underline{180})$	=	2,198 x 7,256	= 15,950
P	140	$(\underline{7 \times 119,761}) + (\underline{5 \times 13,106}) + (\underline{3 \times 1,137}) + (\underline{1,170})$	=	1,622 x 8,964	= 14,540
S	140	$(\underline{7 \times 43,592}) + (\underline{5 \times 1,145}) + (\underline{3 \times 1,706}) + (\underline{590})$	=	565 x 11,265	= 6,365
AF	140	$(\underline{7 \times 10,032}) + (\underline{5 \times 9,639}) + (\underline{3 \times 1,191}) + (\underline{0})$	=	218 x 3,429	= 745
LP-WIP	120	$(\underline{7 \times 5,951}) + (\underline{5 \times 94,885}) + (\underline{3 \times 41,596}) + (\underline{0})$	=	1,335 x 3,392	= 4,530
		TOTAL		<u>5,938</u>	<u>42,130</u>

(Continued on next page)

Appendix Table 22 (continued)

## A. KEMP FORMULA (continued)

OTHER PRODUCTS

(From harvest cuttings in sawtimber stands):

<u>Forest Type</u>	<u>Rotation years</u>	<u>Cutting Area acres</u>	<u>Average Volume/Acre Other Products (CF)</u>	<u>AAC (MCF)</u>
L-D	160	2,198	274	602
P	140	1,622	129	209
S	140	565	662	368
AF	140	218	185	40
LP-WLP 1/	120	1,335	634	846
<b>TOTAL</b>		<b>5,938</b>		<b>2,065</b>

1/ One-half total area.

(From polestands usually over rotation age--on poor sites):

<u>Forest Type</u>	<u>Rotation</u>	<u>AAC</u>	<u>Acres</u>	<u>CF/Ac.</u>	<u>MCF</u>
LP-WLP 1/	100	5(100,836) + (3 x 41,596) + (0)	= 2,096 x 1,283	= 2,689	
<u>(Total Other Products Available):</u>					

Acres: 8,034      AAC: 4,754 MCF

1/ One-half total area.

(Continued on next page)

Appendix Table 22 (cont'd)

B. VON MANTEL FORMULA

$$AAC = \frac{2 \cdot Ga}{R}$$

AAC = Annual Allowable Cut  
 Ga = Volume of total growing stock (in cubic feet)  
 R = Rotation

Forest Type	Rotation	Annual Allowable Cut		
		Sawtimber	Other Products	
L-D	160	$2 \times \frac{355,362}{160} = 4,442 \text{ MCF} \times .801 = 3,558 \text{ MCF}$		384 MCF
		$3,558 \times 4.9 = 17,434 \text{ MBF}$		
P	140	$2 \times \frac{239,429}{140} = 3,420 \text{ MCF} \times .911 = 3,116 \text{ MCF}$		304 MCF
		$3,116 \times 5.0 = 15,580 \text{ MBF}$		
S	140	$2 \times \frac{131,219}{140} = 1,874 \text{ MCF} \times .768 = 1,439 \text{ MCF}$		435 MCF
		$1,439 \times 5.0 = 7,195 \text{ MBF}$		
AF	140	$2 \times \frac{18,238}{140} = 260 \text{ MCF} \times .518 = 135 \text{ MCF}$		125 MCF
		$135 \times 4.75 = 641 \text{ MBF}$		
LP-WIP	110	$2 \times \frac{259,295}{110} = 3,989 \text{ MCF} \times .352 = 1,404 \text{ MCF}$		2,585 MCF
		$1,404 \times 4.6 = 6,458 \text{ MBF}$		
TOTAL		47,308 MBF	9,652 MCF	4,329 MCF

(Continued on next page)

Appendix Table 22 (cont'd)

**C. HANZLIK FORMULA**

$$\text{AAC} = \frac{V_m}{R} + I$$

$V_m$  = Vol. of growing stock  
over rotation age  
 $R$  = Rotation  
 $I$  = Mean Annual Increment

Forest Type	Rotation	Annual Allowable Cut		Other Products
		Sawtimber	Total	
L-D	160	$\frac{733.1}{160} + 9.7 = 14.3 \text{ MMBF}$		$\frac{27,685}{160} + 955 = 1,127 \text{ MCF}$
P	140	$\frac{655.0}{140} + 9.5 = 14.2 \text{ MMBF}$		$\frac{9,427}{140} + 108 = 175 \text{ MCF}$
S	140	$\frac{388.0}{140} + 4.2 = 7.0 \text{ MMBF}$		$\frac{22,805}{140} + 344 = 507 \text{ MCF}$
AF	140	$\frac{34.4}{140} + .8 = 1.0 \text{ MMBF}$		$\frac{1,856}{140} + 114 = 246 \text{ MCF}$
LP-WLP	110	$\frac{20.1}{110} + 3.1 = 3.3 \text{ MMBF}$		$\frac{3,373}{110} + 3,251 = 3,281 \text{ MCF}$
TOTAL		39.8 MMBF		5,336 MCF

(Continued on next page)

Appendix Table 22 (cont'd)

C. HANZLIK FORMULA (cont'd)

VOLUME OF GROWING STOCK OVER ROTATION AGE

Forest Type	Area Sawtimber	Area Over Rotation Age		Volume Per Acre		Total Volume Over R Years	
		acres	percent	Sawtimber (BF)	Other Products (CF)	Sawtimber (MMBF)	Other Products (MCF)
L-D	181,019	101,043	55.8	7,256	274	733.1	27,685
P	119,761	73,077	61.0	8,964	129	655.0	9,427
S	43,592	34,448	77.0	11,265	662	388.0	22,805
AF	10,032	10,032	100.0	3,429	185	34.4	1,856
LP-WLP	5,951	5,951	100.0	3,392	634	20.1	3,773
<b>TOTAL</b>	<b>360,355</b>	<b>224,551</b>				<b>1,830.6</b>	<b>65,506</b>

Appendix Table 22 (continued)

D.	AUSTRIAN FORMULA	$AAC = I + \frac{Ga - Gr}{R}$	$I = MAI \text{ or } PAI$	$Gr = \text{Realizable growing stock}$
			$Ga = \text{Actual growing stock}$	$R = \text{Rotation}$
Larch-Douglas-fir	<u>Rotation: 160 years</u>	<u>Site: IV Ponderosa Pine</u>	<u>Rotation: 140 years</u>	<u>Site: IV</u>
	<u>Age</u>	<u>Normal Yield</u>	<u>Age</u>	<u>Normal Yield</u>
	<u>40</u>	<u>-</u>	<u>40</u>	<u>600</u>
	60	50	60	5,200
	80	2,150	80	12,700
	100	5,080	100	20,600
	120	8,640	120	27,200
	140	12,950	140	16,200 (1/2 normal)
	160	<u><math>\frac{7,685}{36,555}</math> (1/2 normal)</u>		
	Total		Total	<u>82,500</u>
			$Gr = \frac{82,500 \times .70 \times 20}{140} = 8,250 \text{ BF/acre}$	
			Total growth = 135,471 x 8,250 = 1,118 MMBF	
			$AAC = 9.5 + \frac{1,095 - 1,118}{140} = 9.3$	
Spruce	<u>Rotation: 140 years</u>	<u>Site: III-IV</u>	<u>Subalpine Fir</u>	<u>Rotation: 140 years</u>
	<u>Age</u>	<u>Normal Yield</u>	<u>Age</u>	<u>Normal Yield</u>
	<u>40</u>	<u><math>\frac{165}{62,105}</math></u>	<u>40</u>	<u>30</u>
	60	405	60	50
	80	4,840	80	2,530
	100	14,845	100	9,050
	120	25,625	120	17,280
	140	<u><math>\frac{16,225}{62,105}</math> (1/2 normal)</u>	140	<u><math>\frac{11,235}{40,175}</math> (1/2 normal)</u>
	Total		Total	
			$Gr = \frac{40,175 \times .70 \times 20}{140} = 4,017 \text{ BF/acre}$	
			Total growth = 21,237 x 4,017 = 85 MMBF	
			$AAC = .8 + \frac{45,085}{140} = .5$	

(Continued on next page)

Appendix Table 22 (continued)

D. AUSTRIAN FORMULA (continued)

Lodgepole Pine - Whitebark Limber Pine		Rotation:	120 years	Site: IV-V
Age	Normal Yield			
40	137			
60	7,250			
80	12,500			
100	17,600			
120	10,400 (1/2 normal)			
Total	47,887			

Gr =  $\frac{47,887 \times .70 \times 20}{120} = 5,586 \text{ BF/acre}$

Total growth =  $146,248 \times 5,586 = 817 \text{ MMBF}$

AAC =  $3.1 + \frac{436 - 817}{120} = 0$

Appendix Table 22 (continued)

## E. TABULAR CHECK

Tentative AAC: 44.0 MMBF    Average Rotation: 142 yrs. Forest Types: All

Present Age Group (years)	Average Cutting Age (years)	Com'l Forest Area (acres)	PAI or MAI (BF)	Vol./acre at Ave. Cutting Age (BF)	Total Volume to Cut (MMBF)	Years to Cut			Area Cut per Year (acres)
						Each Age Group	30	Cumulative (years)	
200+		141,370	79 1/	Res. 8,138 Gr. 1,185	1,150.5 167.5				4,730
181-200	215	38,507	79	Res. 8,138 Gr. 2,686	313.4 103.4		9	39	4,270
161-180	208	63,112	79	Res. 8,138 Gr. 3,713	513.6 234.3		17	56	3,720
141-160	200-217	82,695	79	Res. 8,138 Gr. 5,372	673.0 444.2		25	81	3,310
121-140	209	44,515	79	Res. 6,820 Gr. 6,952	303.6 309.4		14	95	3,180
101-120	202-216	47,306	79	Res. 2,153 Gr. 7,900	101.8 373.7		11	106	4,270
81-100	190	38,426	79	Res. 2,153 Gr. 8,690	82.7 333.9		9	115	4,270
61- 80	186-195	32,210	79	Res. 2,153 Gr. 9,401	69.3 302.8		8	123	4,030
41- 60	176-184	24,238	82 2/	Res. 1,430 Gr. 10,332		250.4	6	129	4,040
21- 40	167	34,179	85	Res. - Gr. 11,390		389.3	9	138	3,800
1- 20	154	7,881	85	Res. - Gr. 11,850		93.1	2	140	3,940
Restock	140-141	1,940	85	Res. - Gr. 11,900		23.1	1	141	1,940
TOTAL		556,379							

1/ Periodic annual increment.

2/ Mean annual increment for 70 percent stocking.

CALCULATION OF ANNUAL ALLOWABLE INTERMEDIATE CUT  
 National-Forest Land (Nonreserved)

Appendix Table 23

Bitterroot Working Circle

ANNUAL ALLOWABLE AREA TO CUT

Well-Stocked Strata	Commercial Forest (acres)	Area Under Rotation Age		Area to Cut Annually (acres)
		(percent)	(acres)	
<u>Sawtimber</u>				
L-D9	3,211	44	1,412	70
P9	2,243	39	874	42
S9	1,626	21	342	17
AF9	85	0	0	0
<u>Pole</u>				
L-D8	12,947	100	12,947	647
P8	4,352	100	4,352	217
S8	485	100	485	24
AF8	845	100	845	42
LP-WLP8	66,384	37	24,562	1,228
<b>TOTAL</b>	<b>92,178</b>			<b>2,287</b>

AVERAGE VOLUME PER ACRE

Well-Stocked Strata	Volume Per Acre		Assumed Cut <sup>1/</sup> (percent)	Volume to Cut Per Acre	
	Sawt. (MBF)	Other (CF)		Sawt. (MBF)	Other (CF)
<u>Sawtimber</u>					
L-D9	16.2	205	25	4.0	51
P9	15.0	300	25	3.7	75
S9	24.5	350	25	6.1	87
<u>Pole</u>					
L-D8	4.8	1,210	25	1.2	302
P8	2.8	590	25	.7	147
S8	1.9	1,650	25	.5	412
AF8	.9	1,430	25	.2	357
LP-WLP8	1.2	945	25	.3	236

1/ Percentage of cut believed most appropriate for fully stocked stands.

Appendix Table 23 (continued)

ANNUAL ALLOWABLE INTERMEDIATE CUT

Well-Stocked Strata	Area to Cut Annually (acres)	Volume to Cut	
		Sawtimber (MBF)	Other Products (MCF)
<u>Sawtimber</u>			
L-D9	70	280	3.6
P9	42	155	3.1
S9	17	105	1.5
<u>Pole</u>			
L-D8	647	776	195.4
P8	217	152	31.9
S8	24	12	9.9
AF8	42	8	15.0
LP-WLP8	1,228	368	289.8
TOTAL	2,287	1,855	550.2

WORKING CIRCLE CONTROL RECORD SUMMARY

(Ref. FSH 2444.5)

Appendix Table 24

Bitterroot Working Circle

Fiscal Year	Product	Regulated Cut			Status of Cumulative Cut	Adjusted Allowable Cut	Annual Cut	Nonregulated Cut	Cumulative Cut
		Allowable Cut	Cumulative Allowable Cut	Actual Annual Cut <u>1/</u>					
1957	11"+	-	-	-	-	-	-	-	-
	11"-	26.0 35.0	26.0 35.0	18.0 -	18.0	-8.0 -35.0	34.0 -	-	-
1958	11"+	26.0 35.0	52.0 70.0	24.8 -	42.8	-9.2 -70.0	35.2 -	-	-
	11"-	-	-	-	-	-	-	-	-
1959	11"+	26.0 35.0	78.0 105.0	27.1 -	69.9	-8.1 -105.0	34.1 -	-	-
	11"-	-	-	-	-	-	-	-	-
1960	11"+	26.0 35.0	104.0 140.0	27.7 -	97.6	-6.4 -140.0	32.4 -	-	-
	11"-	-	-	-	-	-	-	-	-
1961	11"+	26.0 35.0	130.0 175.0	30.0 -	127.6	-2.4 -175.0	28.4 -	-	-
	11"-	-	-	-	-	-	-	-	-

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1/ Estimated to June 30, 1961.

Note: 35MM of Other as shown in management plan has been carried separately. Cut in this category is nil. No market developed for material.



PROPOSED CUT AND SELL PLANS  
 (Reference FSH 2412.5)

Appendix Table 25a

District: Stevensville

Bitterroot Working Circle

Compart- ment No.	Volume Under Contract	In millions of board feet											
		Last half FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966	
Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut
All comp.	Under \$300 - \$2,000	.1	.4										
7A	Eight Mile Salvage (\$2000-2MM)	.5	.5										
7A	North Eight Mile (2-5MM)	4.0	2.0										
19,20,21	Willow Creek (5-15MM)			2.0	1.0								
Total Active Sales		4.6	2.9			3.0		1.0		1.0			
<u>Proposed Sales</u>													
All comp	Under \$300 - \$2,000			.4	.4			.4	.4	.4	.4	.4	.4
	\$2,000 - 2MM												
167,167A	McClain Creek R/W <sup>1</sup> /			2.0	1.0			1.0	.5				
162A	Larry-Sweeney Creek												
21	Willow Mountain												
8	Three Mile Creek												
15	Sawmill Creek												
154	Sweathouse Creek												
	2MM - 5MM												
155	St. Mary's												
7A	Sluice Creek R/W <sup>1</sup> /												
156,156A	McCalla Creek												
	5MM - 15MM												
155	Big Creek												
<u>TOTAL</u>		4.6	2.9	7.4	5.4	7.4	4.9	5.9	7.9	5.4	6.9	6.4	5.9
-	-	-	-	-	-	-	-	-	-	-	-	-	-

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1/ May be held up pending R/W settlement.

(Continued on next page)

### Appendix Table 25a (continued)

District: Derby

Compart- ment No.	Volume Under Contract	In millions of board feet											
		Last half FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966	
Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut
All comp	Under \$300.00	.1	.1										
34, 35	\$300 - \$2,000	.4	.4										
26	Fox Creek Salvage (2-5MM)			.7		1.8							
30, 31	Gird Creek (5-15MM)			1.3		2.7		2.7		1.5			
	Two Bear (over 15MM)	16.1	1.0	3.3		3.3		3.3		3.3			
	Total Active Sales	16.6	3.5	7.8		6.0		4.8		3.3			
	<u>Proposed Sales</u>												
	Under \$300.00												
	\$300 - \$2,000												
	\$2,000 - 2MM												
64	Robbins Gulch Salvage 1/												
139	Lick Creek												
143, 146	Camas-Roaring Lion 1/												
131, 133	McCoy-Spoon Creek												
1, 2	Blacktail												
123, 124	Pierce-Trapper												
125	Little Trapper Salvage												
	2MM - 5MM												
37	Rye Creek Salvage North side												
37	Rye Creek Salvage South side												
1, 135	Little Sleeping Child 1/												
29	Weasel-Hogtrough												
62	Doran Pt. 1/ Salvage												
134, 137	Bunkhouse 1/												
	5MM - 15MM												
25, 28	Gird Creek-Skalkaho												
29, 23	Coyote Meadows												
	TOTAL	19.6	3.8	10.5	12.3	8.2	16.4	14.9	13.7	5.9	11.7	9.4	11.3

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1/ May be held up pending R/W negotiations.

Appendix Table 25a. (Continued)

District: Sula

Compart- ment No.	Volume Under Contract	In millions of board feet													
		Last half FY 1961			FY 1962			FY 1963			FY 1964			FY 1965	
Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut
All comp	\$300 - \$2,000	.2	.2	.3	.2	1.0	1.0								
78	Wagon Road Salvage (\$2000-2MM)	1.3				1.0									
38	Hart Creek Salvage (\$2000-2MM)	1.2	.2	1.2		1.0									
79	W.Camp Cr.Salvage (2-5MM)					2.0									
78,79	E.Camp Cr.Salvage (2-5MM)					1.0		2.2							
41-43,45	Martin Creek (5-15MM)					1.9		2.8		2.7					
64,65	Medicine Tree (5-15MM)					1.4		3.0		3.0					
39,40,58,60	Cameron-Lytman (over 15MM)					1.5		3.0		3.0					
	Total Active Sales	2.7	7.7	15.0	5.7										
	Proposed Sales														
All comp	\$300 - \$2,000														
	\$2,000 - 2MM														
61	South Two Percent														
46	East Tepee														
52	Lower Meadow Creek														
	2MM - 5MM														
76	Reimel Creek														
46-48	West Tepee-Bertie Lord														
50	Culvert Creek														
53	Tolian Creek														
47	Swift Creek-Echo Gulch <sup>1/</sup>														
41	Upper Martin														
43	Moose Creek														
	TOTAL	2.7	7.7	2.6	16.6	4.2	8.9	7.8	6.2	8.5	7.0	13.5	7.5		

1/ Depending on verification of proposed alteration  
of Pintler Wilderness Area Boundary.

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Appendix Table 25a (continued)

## District: Westfork

Compart- ment No.	Volume Under Contract	In millions of board feet											
		Last half FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966	
Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut	Sell	Cut
All comp 95,96	\$300 - \$2,000 (5-15M)	.7	.6	2.8	1.0	4.0		4.0		4.0		4.0	
108,109	Blue Joint (5-15M)			1.0		4.0		4.0		4.0		4.0	
107-109	L.Blue Joint-Took Cr.(over 15M)			1.0		4.0		4.0		4.0		4.0	
	Total Active Sales	.7	5.4										
	Proposed Sales												
All comp	\$300 - \$2,000 <u>\$2,000 - 2M</u>												
110	One Creek Salvage												
110	Two Creek Salvage												
110	Tough Creek Salvage												
96	Elk Creek												
110	Beetle Gulch												
116	Boulder Point <u>2MM - 5MM</u>												
92	Rombo Creek												
111-169	Nezperce-Barecone												
86	East Piquett Creek												
104	West Creek <u>5MM - 15MM</u>												
97	Overvich Creek												
106	Coal Creek												
98	Hughes Creek												
99	Thunder Mountain #1												
100	Thunder Mountain #2												
	TOTAL ALL SALES	.7	5.4	14.4	14.9	23.5	16.5	14.5	16.0	12.5	13.1	8.5	9.5
		27.6	19.8	34.9	49.2	43.3	46.7	43.1	43.8	32.3	38.7	37.8	34.2

TIMBER ACCESS ROADS--DETAILS BY PROJECTS  
 (Reference FSH 2412.5)

Appendix Table 25b

District: Stevensville

Bitterroot Working Circle

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Estimated cost (M\$)	Mi. Gov't	Estimated cost (M\$)	Mi. Gov't	Estimated cost (M\$)	Mi. Gov't	Type Planned	Survey
167 & 167A	McClain Creek	L.A. 1311	C	Total						#1	#1
		2155.2	C			49,000				#2	5. mi.
			Cattle Guards	7.0							2. mi.
			L.U.								2 mi.
		1312	C								
		1313	C								
		1312A	C								
		1312B	C								
		1313A	C								
		1313B	C								
		1380	C								
		1380A	C	14.0		70,000					
										2	2
											1961

(Continued on next page)

Appendix Table 25b (continued)

District: Stevensville (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned Mi.	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey		
					Estimated Cost (M\$)	Gov't Oper- ator	Estimated Cost (M\$)	Gov't Mi.	Gov't Oper- ator	Estimated Cost (M\$)	Gov't Mi.	Type Planned	Date of Comple- tion
162	Larry-Sweeney Creek	L.A. 1302	C		2.0		14,000	1.0		7,000	2	2	1962
		L.U. 1136B	C										
		1316	C										
		1316A	C										
		1136A	C										
		- - - - -	- - - - -										
21	Willow Mountain	L.A. 1302	C - CU										
		L.U. 1302A											
		1302B											
		1302C	C										
		1302D											

(Continued on next page)

#### Appendix Table 25b (continued)

District: Stevensville (continued)

(Continued on next page)

Appendix Table 25b (continued)

## District: Stevensville (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Mi.	Estimated Cost (M\$)	Mi.	Estimated Cost (M\$)	Mi.	Estimated Cost (M\$)	Mi.	Date of Comple- tion
15	Sawmill Creek	L.A. 710	C					0.5	3,500	2	2
		L.U. Banked Mile.	C					1.5	7,500	2	2
154	Sweathouse Creek	L.A. 1322	C					3.0	21,000	2	2
		L.U. Banked Mile.	C					4.0	20,000	2	2
155	St. Marys	L.A. 739.2	C	4.0	28,000	2.5	17,500				1963
		L.U. 739A 739C 739E 739F	C C C C							2	2
									32,500		1961

(Continued on next page)

Appendix Table 25b (continued)

## District: Stevensville (continued)

Com-part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Estimated Cost (M\$)	Mi.	Estimated Cost (M\$)	Mi.	Type Planned	Survey	Design	
								Oper- ator	Gov't	Design	
*	Sluice Creek	L.A. <u>1308</u>		3.0	21,000	2.0	14,000	2	2	1960	
		L.U. <u>1308E</u>									
		1308F									
		1330									
		1330A									
		1333									
		1329									
		1329A									
		5782									
		5782A									
		1308G									

(Continued on next page)

## Appendix Table 25b (continued)

District: Darby

(Continued on next page)

Appendix Table 25b (continued)

District: Darby (continued)

(Continued on next page)

Appendix Table 25b (continued)

District: Darby (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned Mi.	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey		
					Estimated cost (M\$)	Gov't Oper- ator	Estimated cost (M\$)	Gov't Oper- ator	Estimated cost (M\$)	Gov't Oper- ator	Type Planned	Date of Comple- tion	
139	Lick Creek	L.A. <u>5621.2</u>	R - CU		4.0	2,400	8,000				2	2	1961
		L.U. <u>5621B</u>	R		0.9	540	1,800				2	2	- - -
		<u>5621C</u>	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
64	Robbins Gulch	L.A. <u>446.1</u>	R - CU	4.0	2,400	8,000					2	2	1961
		"	C	.5	300	3,500					2	2	1961
		L.U. <u>446A</u>	C - CU	1.0	600	5,000	1.0	600	5,000		2	2	1961

(Continued on next page)

Appendix Table 25b (continued)

District: Darby (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey			
				Mi.	Estimated cost (M\$)	Mi.	Estimated cost (M\$)	Gov't	Type Planned	Gov't	Estimated cost (M\$)		
1 & 135	Little Sleeping Child	L.A. 321.2 702	C		1.5	10,500	.9			6,300	2	2	1962
		L.U. 321B 702B 702C 702D	C		2.3	11,500	1.3			6,500	2	2	1962
37	Rye Creek Salvage South Side	L.A. 75.2 10006	C - CU		2.0	1,200	14,000	2.0	1,200	14,000	2	2	1962
		L.U. 10005 10005A 10005B 10005C 10006A 10007 10007A	C		3.0	1,800	15,000	3.5	2,100	17,500	2	2	1962

(Continued on next page)

Appendix Table 25b (continued)

## District: Darby (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Mi.	Estimated cost (M\$) Gov't operator	Mi.	Estimated cost (M\$) Gov't operator	Mi.	Estimated cost (M\$) Gov't operator	Mi.	Estimated cost (M\$) Gov't operator
37	Rye Creek Salvage North Side	L.A. <u>5607</u>	C - CU	3.0	1,800	21,000	1.0	600	7,000	-	2
		L.U. <u>715A</u>	R	-	-	-	1.5	900	3,000	-	2
143 & 146	Camas- Roaring Lion	L.A. <u>5619</u> "	R - CU C - CU	-	-	(Cattle Guards*)	-	-	-	1.0 3.0	1,600* 600 1,800
		L.U. Banked	Mile.	C	-	-	-	-	-	2,000 21,000	2
29 & 33	Coyote Meadows	L.A. <u>75.2</u>	C - CU	-	-	-	-	-	-	-	2
		L.U. <u>1306E</u>	Banked Mile.	-	-	-	-	-	-	-	-

(Continued on next page)

Appendix Table 25b (continued)

## District: Darby (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Gov't Mi.	Estimated cost (M\$)	Gov't Mi.	Estimated cost (M\$)	Gov't Mi.	Estimated cost (M\$)	Gov't Mi.	Type Planned
Gird Skalkaho Sale	L.A. 722.2 1361	C - CU	2.0	1,200	14,000	1.5	900	10,500	1.5	900	Road Survey
	L.U. 1363 1363A 1363B 1361A 722A 722B	C	5.7	3,420	28,500	5.2	3,120	26,000	5.1	3,060	25,500
Weasel- Hog Trough	L.A. 1135	C	-	-	-	-	-	-	-	-	-
	L.U. 1351 1351A 1135A 1135C 1135D 1135F 5749 5749A	C	2.0	1,200	14,000	2.0	1,200	14,000	2	1,200	14,000

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Appendix Table 25b (continued)

District: Sula

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62 Estimated cost (M\$)	Proposed FY '63 Estimated cost (M\$)	Proposed FY '64 Estimated cost (M\$)	Road Survey		
							Type Gov't Survey	Planned Oper- ator	Design
39, 40 58, 60	Cameron- Lyman	L.A. 1398	C	2.0	14,000				2 2
		L.U. 311A 311B 311C 311D 1398A 1398B 1396A 1396B 8152 8152A 717A				45,000			1958 & 1959
- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
41, 42 43, 45	Martin Creek	L.A. 5773 726	C	5.0	35,000	3.0	21,000		2 2
		L.U. 726A 726B 726C 8196 8176				60,000	6.0	30,000	1959
- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -

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Appendix Table 25b (continued)

## District: Sula (continued)

Com-part-ment No.	Name of Sale	Road Proj-ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Gov't	Estimated cost (M\$)	Mi.	Oper-ator	Gov't	Estimated cost (M\$)	Mi.	Oper-ator
78,79	East Camp Creek Salvage	L.A. 8116 729	R C	4.0 .8	8,000 5,600					2	2
		L.U. 8117 8116A 8118 8118A				40,000				2	2
76	Reimel Creek	L.A. 5736	C	8.0				4.0	2,400 3,200	28,000	
		L.U. Banked Mile.							8.0	4,800 1,200	40,000 14,000
46,48	West Fepee & Bertie Lord	L.A. 723	C					2.0		5.0 mi	2
		L.U. Banked Mile.								5.0 mi	2
										9.0 mi	9.0 mi

(Continued on next page)

Appendix Table 25b (continued)

## District: Sula (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62			Proposed FY '63			Proposed FY '64			Road Survey		
				Mi.	Gov't	Oper- ator	Mi.	Gov't	Oper- ator	Mi.	Gov't	Oper- ator	Type Planned	Survey	Design
46	East Tepee	L.A. <u>5781</u>	C				2.0	1,200	14,000	2			2	2	1963
		L.U. Banked	C										2	2	1964
		Mile.		-	-	-							4.0	4.0	mi
52	Lower Meadow Creek	L.A. <u>5759</u>	C - CU	3.0	1,800	21,000							2	2	1963
		L.U. Banked	C										2	2	1964
		Mile.		-	-	-							6.0	6.0	mi
78	Wagon Road Salvage	L.U. <u>5735A</u>	C - CU	2.2	1,320	10,100							2	2	1961
													-	-	-

(Continued on next page)

Appendix Table 25b (continued)

District: West Fork

Com-part-ment No.	Name of Sale	Road Proj-ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Estimated cost (M\$)	Mi.	Estimated cost (M\$)	Mi.	Estimated cost (M\$)	Mi.	Type Planned	Date of Completion
Gov't	Oper-ator	Gov't	Oper-ator	Gov't	Oper-ator	Gov't	Survey	Design			
107E	Took Creek & Little Blue Joint	L.A. 5648 5649 5656 5658	C	3.3	23,100	3.3	23,100	2.8	19,600	2	2
		L.U. 5649A 5649B 8130 8130A 8129 8129A 8128 8128A 5648A 5648B 5648C 5648D 5648E 8127 8127A 8126 8126A 8126B							3.0 mi	3.0 mi	1959

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### Appendix Table 25b (continued)

District: West Fork (continued.)

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Appendix Table 25b (continued)

## District: West Fork (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey		
				Mi.	Estimated cost (M\$)	Mi.	Estimated cost (M\$)	Mi.	Estimated cost (M\$)	Gov't	Type Planned	
Oper- ator	Gov't	Oper- ator	Gov't	Oper- ator	Gov't	Oper- ator	Gov't	Operator	Design		Date of Comple- tion	
92	Rombo Creek (cont'd)	L.U. 5718A 5718B 5718C 10002A 10003 10003A	C	1.6	1.0	8,000	14.4	72,000	-	2	2	1960
96	Elk Creek	L.A. 1134	R - CU	1.1	660	7,700	-	-	-	2	2	1960
110	Beetle Gulch	L.U. 1134A 1134C	C - CU C - CU	1.2 2.1	720 1,260	6,600 10,500	-	-	-	2	2	1960
116	Boulder Point	L.A. 5637	C - CU	1.5	900	10,500	-	-	-	2	2	1961
		L.U. 5637H	C - CU	1.0	600	5,000	-	-	-	2	2	1961
					4.0	2,400	28,000			2	2	1961

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Appendix Table 25b (continued)

District: West Fork (continued)

Com- part- ment No.	Name of Sale	Road Proj- ect No.	Kind of Work Planned	Estimated cost (M\$) Planned	Proposed FY '62		Proposed FY '63		Proposed FY '64		Type Planned Survey	Design Survey	Date of Comple- tion
					Mi.	Oper- ator	Mi.	Oper- ator	Mi.	Oper- ator			
97	Overwhich Creek Sale	L.A. 5697 5698 5701 5702 5703 5704 5705 5708	C	4.0	28,000	6.0	42,000	6.0	42,000	2	2	2	1961
		L.U. 5699 5699D 5700 5700B 5701A 5701B 5701C 5702B 5702C 5703A 5703B 5703C 5703E											

(Continued on next page)

Appendix Table 25b (continued)

## District: West Fork (continued)

Com-part-ment No.	Name of Sale	Road Proj-ect No.	Kind of Work Planned	Planned FY '62		Proposed FY '63		Proposed FY '64		Road Survey	
				Oper-ator Mi.	Estimated cost (M\$)	Oper-ator Mi.	Estimated cost (M\$)	Oper-ator Gov't	Type Planned	Survey Design	Date of Completion
97	Overwhich Creek Sale (cont'd)	L.U. 5704D 5705A 781 781A	C	4.0	20,000	9.0	45,000	-	2	2	1961
106	Coal Creek	L.A. 5659 5660 5662	C	-	-	-	-	-	12 mi.	12 mi.	-
		L.U. 5659C 5660A 5660B 5660C 782 782A 1389 1389A	C	4.0	12,000	28,000	4.0	28,000	2	2	1962
		5659B 5662B 5662D 5662E 5662H	-	6.0	30,000	6.0	-	4.0 mi	4.0 mi	7.5 mi	2 7.5 mi
		-	-	-	-	-	-	-	-	-	-

### Appendix Table 25b (continued)

### District: West Fork (continued)

ACTUAL CUT PAST 15 YEARS (1946-1960 INCL.) BY SPECIES

Appendix Table 26

Bitterroot Working Circle

Calendar Year	Species					Total <sup>2/</sup>
	Ponderosa Pine	Douglas-fir and Larch	Spruce Alpine fir Grand fir	Lodgepole Pine <sup>1/</sup>		
	MBF					
1946	6,804	1,316	153	46	8,318	
1947	10,036	5,423	126	417	16,002	
1948	8,851	6,947	208	1,130	17,136	
1949	6,273	5,273	78	1,386	13,010	
1950	7,925	4,980	20	581	13,506	
1951	9,161	6,340	-	445	15,946	
1952	15,608	6,880	202	165	22,855	
1953	13,785	7,279	4	118	21,186	
1954	7,171	5,939	27	31	13,168	
1955	9,077	11,948	153	-	21,178	
1956	12,082	15,033	554	237	27,906	
1957	7,825	9,721	321	153	18,020	
1958	10,704	13,525	340	252	24,821	
1959	9,029	17,437	337	231	27,034	
1960	6,568	18,629	2,301	194	27,692	
TOTAL	140,899	136,670	4,823	5,386	287,778	
ANNUAL AVERAGE	9,393	9,111	322	359	19,185	

1/ Includes poles, piling, miscellaneous products--no market for lodgepole pine and other species of 35 MM shown in 1957 Plan developed.

2/ Sawtimber class.

## CURRENT DETERMINATION OF PLANTABLE ACRES AND

PLANNED 4-YEAR PLANTING PROGRAM

Appendix Table 27

Bitterroot Working Circle

## STEVENSVILLE BLOCK

	Needing Planting Survey	Surveyed	Total
	acres		
Cumulative total brought forward from previous report	1,477		1,477
Added during current year by:			
1. Fire	-		-
2. Cutting	112		112
3. Other (land acquisition, etc.)	-		-
Total	1,589		1,589
Less total planted or to be subtracted	-		-
Grand total all classes to date	1,589		1,589
-----			
Of the above total how many acres are <sup>1/</sup> :			
1. Ready for planting now	266		266
2. In need of preparation:			
a. Brush eradication	623		623
b. Hazard reduction (snags, etc.)			
c. Other (specify)			
Rodent control	100		100
Disease control - mistletoe	400		400
Sod elimination & terracing	200		200

1/ All acres included in "Grand total all classes to date" should be included in this breakdown.

(Continued on next page)

## PROPOSED 4-YEAR PLANTING PROGRAM

Appendix Table 27 (continued)

## STEVENSVILLE BLOCK (continued)

Fiscal Year	Ele- vation	Fund	Acres and M <sup>t</sup> trees by species												Total
			W		P		D		S		C		LP		
Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	Total
1962	K-V														
	P&M														
	K-V														
1963		5,000	P&M												
1964	K-V														
	P&M														
	K-V														
1965		5,000	P&M												

(Continued on next Page)

Appendix Table 27 (continued)

## DARBY BLOCK

	Needing Planting Survey	Surveyed	Total
	acres		
Cumulative total brought forward from previous report	1,166	870	2,036
Added during current year by			
1. Fire	-	-	-
2. Cutting	-	1,360	1,360
3. Other (land acquisition, etc.)	-	-	-
Total	1,166	2,230	3,396
Less total planted or to be subtracted	820	600	1,420
Grand total all classes to date	346	1,630	1,976
<hr/>			
Of the above total how many acres are <sup>1/</sup>			
1. Ready for planting now	60	492	552
2. In need of preparation:			
a. Brush eradication	106	414	520
b. Hazard reduction (snags, etc.)	-	-	-
c. Other (specify)			
Sod elimination and terracing <sup>2/</sup>	180	724(370)	904(370)

1/ All acres included in "Grand total all classes to date" should be included in this breakdown.

2/ Items in parenthesis are the acres included in hazard reduction that also require terracing on the same acres requiring hazard reduction. These acres thus are not duplicated in grand total acres requiring planting.

(Continued on next page)

Appendix Table 27 (continued)

## DARBY BLOCK (continued)

Fiscal Year	Elev-ation	Fund	Acres and M trees by species												Total
			W	M	P	D	S	C	LPP	Acres	M	Acres	M	Acres	M
1962	5,000	K-V													
		P&M													
	6,000	K-V													
		P&M													
1963	5,000	K-V													
		P&M													
	6,000	K-V													
		P&M													
1964	5,000	K-V													
		P&M													
	6,000	K-V													
		P&M													
1965	5,000	K-V													
		P&M													
	6,000	K-V													
		P&M													

Appendix Table 27 (continued)

## SULA BLOCK

	Needing Planting Survey	Surveyed	Total
	acres		
Cumulative total brought forward from previous report	1,750	920	2,670
Added during current year by			
1. Fire	340	860	1,200
2. Cutting	-	235	235
3. Other (land acquisition, etc.)	-	-	-
Total	2,090	2,015	4,105
Less total planted or to be subtracted	-	-	-
Grand total all classes to date	2,090	2,015	4,105
-----	-----	-----	-----
Of the above total how many acres <sup>1/</sup>			
1. Ready for planting now	350	535	885
2. In need of preparation:			
a. Brush eradication	340	560	900
b. Hazard reduction (snags, etc.) <sup>2/</sup>	(340)	(485)	(825)
c. Other (specify)	1,400	920 (75)	2,320 (75)

1/ All acres included in "Grand total all classes to date" should be included in this breakdown.

2/ Items in parenthesis are the acres included in hazard reduction that also require terracing on the same acres requiring hazard reduction. These acres thus are not duplicated in the grand total acres to be planted.

(Continued on next page)

Appendix Table 27 (continued)

## SULA BLOCK (continued)

Fiscal Year	Ele- vation	Fund	Acres and M trees by species												Total
			W		P		D		S		C		LPP		
Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M
1962	6,000	K-V P&M	-	-	-	-	-	-	-	-	-	-	-	300	210
1963	5,000	K-V P&M	50	10	-	-	-	-	-	-	-	-	-	50	10
	6,000	K-V P&M	-	-	-	-	-	-	-	-	-	-	-	225	180
1964	5,000	K-V P&M	50	10	-	-	-	-	-	-	-	-	-	50	10
	6,000	K-V P&M	-	-	-	-	-	-	-	-	-	-	-	160	128
1965	5,000	K-V P&M	-	-	-	-	-	-	-	-	-	-	-	100	80
	6,000	K-V P&M	-	-	-	-	-	-	-	-	-	-	-	100	80

(Continued on next page)

Appendix Table 27 (continued)

## WEST FORK BLOCK

	Needing Planting Survey	Surveyed	Total
	acres		
Cumulative total brought forward from previous report	2,123	57	2,180
Added during current year by:			
1. Fire	-	10	10
2. Cutting	-	108	108
3. Other (land acquisition, etc.)	-	-	-
Total	2,123	175	2,298
Less total planted or to be subtracted	-	35	35
Grand total all classes to date	2,123	140	2,263
-----	-----	-----	-----
Of the above total how many acres are:			
1. Ready for planting now	473	33	506
2. In need of preparation:			
a. Brush eradication	300	50	350
b. Rodent Control	450	-	450
c. Disease control (specify BRC, etc.)	300	-	300
d. Sod elimination	300	37	337
e. Hazard reduction (snags, etc.)	300	-	300
f. Big game control	-	20	20

(Continued on next page)

Appendix Table 27 (continued)

WEST FORK BLOCK (continued)

Fiscal Year	Ele- vation	Fund	Acres and M trees by species												Total
			W		P		D		S		C		LPP		
			Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	Acres	M	
1962		K-V P&M													
	5,000	K-V P&M													
	-	-													
1963		K-V P&M													
	5,000	K-V P&M													
	-	-													
1964		K-V P&M													
	5,000	K-V P&M													
	-	-													
1965		K-V P&M													
	5,000	K-V P&M													
	-	-													

SUMMARY OF K-V WORK, INVENTORY AND PLAN<sup>1/</sup>

NATIONAL FOREST LANDS

Appendix Table 28

Fis- cal Year	Weeding & Cleaning	Thinning, Liberation & Sanitation	Pruning			Cull Tree Slash- ing			Fireline Prep. and Pres. Burn			Brush Brad., Scarification, & Seedbed Prep.			Planting Stock			Total		
			Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Survey	200	200	235	Acres	Cost
<u>STEVENSVILLE BLOCK</u>																				
P&M 1962																				
K-V 1961	28	850	195	6,715	700	8	225	109	4,585											
K-V 1962	28	850	195	6,715	700	8	225	109	4,585											
TOTAL	28	850	252	8,415	8	225	109	4,585									200	200	597	14,275
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<u>DARBY BLOCK</u>																				
P&M 1962																				
K-V 1962																				
K-V 1963																				
TOTAL	340	7,500	270	5,500																
- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	

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1/ Taken from Form R1-2410-1 of Summary of K-V Work,  
Inventory and Plan - National Forest Lands.

(Continued on next page)

Appendix Table 28 (continued)

/ Taken from Form R1-2410-1 of Summary of K-V Work,  
Inventory and Plan - National Forest Lands.

NUMBER OF FIRES, CAUSES, ANDACRES BURNED (1943 - 1960)National Forest Land

Appendix Table 29

Bitterroot Working Circle

Year	Lightning	Man-caused	Total	
			No.	Acres
1943 - 1952	336	44	380	860
Average per Year	33.6	4.4	38.0	86
1953	107	28	135	549.9
1954	91	7	98	39.0
1955	98	3	101	98.6
1956	115	4	119	239.9
1957	95	9	104	97.4
1958	88	6	94	39.4
1959	42	6	48	11.8
1960	98	15	113	3,729.0
Subtotal	734	78	812	4,805.0
Average per Year	91.8	9.7	101.5	606.0
Grand Total	1,070	122	1,192	5,665
Grand Average per Year	59.4	6.8	66.2	314.7

RIGHT-OF-WAY ACQUISITION INVENTORY AND PLAN  
 (Reference FSH 5407.3 - Summary of RI-5460-10 and RI-5460-13, 1962-1965)

Appendix Table 30

Bitterroot Working Circle

FISCAL YEAR 1962					
Project	No.	Miles of Const. or Reconst.	Miles of Survey		Estimated Construction Cost
			Comp.	Need	
<u>Timber Access Roads</u>					
Robbins Gulch	446	6.0	3.0	1.0	18,000
Larry Creek	1136	7.2	-	.5	4,000
Coal Creek	5660	10.0	1.2	-	8,000
McClain Creek	1311	7.0	4.3	-	22,000
Sluice Creek	1331) 1308)	7.5	-	3.5	18,000
Little Sleeping Child	321	6.0	2.0	-	9,000
Ambrose	428	9.7	9.7	-	32,000
West Fork Bitterroot	91.6} 91.7)	12.0	12.0	-	25,000
Subtotal		65.4	32.2	5.0	136,000
<u>All Purpose Roads</u>					
Blodgett Creek	736	3.0	-	2.0	10,000
Canyon Creek	735	7.5	-	2.0	14,000
Antrim Pt.		1.2	-	.2	2,500
Subtotal		11.7	-	4.2	26,500
<u>Existing Roads</u>					
Antrim Pt.		-	-	1.0	-
Eight Mile	601	44.0	-	3.5	-
Subtotal		4.0	-	4.5	-
TOTAL		81.0	32.2	14.7	162,500
Survey Cost - \$21,920					

(Continued on next page)

Appendix Table 30 (continued)

## FISCAL YEAR 1963

Project	No.	Miles of Const. or Reconst.	Miles of Survey		Estimated Construction Cost
			Comp.	Need	
<u>Timber Access Roads</u>					
Roaring Lion	701	9.0	-	4.0	20,000
Skalkaho-Rye Creek	75.3	7.5	-	2.5	12,000
S. Fork Rye Creek	716	7.5	-	2.5	10,000
Reimel Creek	5736	5.0	-	2.0	15,000
Hughes Creek	310	4.0	-	4.0	40,000
Sula Peak	1304	4.5	-	2.5	15,000
Two Percent	5747	4.5	-	2.0	12,000
Subtotal		42.0	-	19.5	124,000
<u>All Purpose Roads</u>					
Willow Creek	364	-	-	1.0	500
Tin Cup	6391	-	-	3.0	20,000
Bear Creek	1141	1.0	-	1.0	5,000
Subtotal		1.0	-	5.0	25,500
<u>Existing Roads</u>					
Willow Creek	364	-	-	1.0	-
Rye Creek	75	3.0	1.0	2.0	-
Slocum	1338	-	-	3.5	-
Subtotal		3.0	1.0	6.5	-
<b>TOTAL</b>		<b>46.0</b>	<b>1.0</b>	<b>31.0</b>	<b>149,500</b>
<u>Survey Cost - \$49,600</u>					

(Continued on next page)

Appendix Table 30 (continued)

## FISCAL YEAR 1964

Project	No.	Miles of Const. or Reconst.	Miles of Survey		Estimated Construction Cost
			Comp.	Need	
<u>Timber Access Roads</u>					
McCoy-Spoon Creek	5623	4.0	-	3.0	15,000
Tolan Creek	5749	5.5	-	3.0	18,000
West Creek	5663	12.0	-	6.0	35,000
Thunder Mountain	5685	6.0	-	2.0	12,000
Subtotal		31.5	-	14.0	80,000
<u>All Purpose Roads</u>					
Sawmill	710	8.0	-	1.0	5,000
Muddy Spring	1343	-	-	2.0	8,000
Lower Carlton Creek	1314	5.5	-	3.0	15,000
Lower Sweathouse	1324	2.5	-	2.0	10,000
Subtotal		20.0	-	8.0	38,000
<u>Existing Road</u>					
Birch Creek	432	9.0	-	6.0	-
Subtotal		9.0	-	6.0	-
TOTAL		60.5	-	28.0	118,000
Survey Cost - \$44,800					

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Appendix Table 30 (continued)

## FISCAL YEAR 1965

Project	No.	Miles of Const. or Reconst.	Miles of Survey		Estimated Construction Cost
			Comp.	Need	
<u>Timber Access Roads</u>					
Bunkhouse	5622	7.0	2.0	3.0	20,000
Echo Gulch	5764	5.0	-	1.0	6,000
Hughes Creek	310	8.0	-	8.0	60,000
Subtotal		20.0	2.0	12.0	86,000
<u>All Purpose Roads</u>					
Bear-Totem	1326.2	7.0	-	3.0	8,000
North Camas	5619	6.0	-	3.0	15,000
Mill Point	1328	9.5	-	3.0	15,000
Subtotal		22.5	-	9.0	38,000
TOTAL		42.5	2.0	21.0	124,000
Survey Cost - \$33,600					



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